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FIELD CROPS

CEREALS

WHEAT

1 VARELA MARTINEZ, R. La importancia economica del cultivo del trigo en Colombia. [**The economic importance of wheat growing in Colombia.**] *Agric. Trop.* 1950, **6**, No. 11, 18-21, illus. [Div. Econ. Rural, Minist. Agric. Canad., Bogota, Colombia]

The work being carried out in Colombia for the improvement of wheat is outlined. Wheat cultivation is only recommended for the cold regions, but the flour mills are on the Atlantic and Pacific coasts, so that transport costs make wheat growing unprofitable at present.—N.G.S.

2 PANELLA, A. Concimazione, precessione colturale e varietà in rapporto ai principali fattori meteorologici nel frumento di alcune rotazioni del Campo Sperimentale di Perugia. [**The influence of manuring, preceding crop and variety, in relation to the principal meteorological factors, on wheat yields from different rotations of the Perugia experimental field.**] *Ann. Fac. Agr. Univ. Perugia* 1949, **6**, pp. 29, bibl. 18. [Received 1951] [Ist. Agron. Univ. Perugia Italy]

Observations were made from 1939 to 1948 on the influence of manuring, preceding crop and variety, in relation to rainfall and temperature, on the yield of wheat from eight different rotations covering 3 to 10 years. The wheats grown were Quaderna, Libero and Perugia B. The preceding crops were maize, or a lucerne or clover ley. Each rotation covered an area of 1000 sq. m., divided into a number of plots equal to the number of crops in the rotation. One section only of each plot received chemical fertilizers while farm-yard manure was applied to the whole plot [quantities not stated]. The following were the main conclusions: (a) the addition of chemical fertilizers gave an average increase in wheat of 5.3 q. of grain per ha.; (b) the grain yield after a ley was higher than after maize, the increase being 5 q/ha. in the 1st rotation (maize/wheat with clover/clover/wheat/maize/wheat/lucerne 3 years/wheat); (c) there was a decrease in wheat yield when the October-November rainfall, i.e. the sprouting period, exceeded 200 mm.; (d) an increase in the average temperature during tillering was favourable to yield; (e) grain yields were low when the minimum temperature in the second decade of April to the first decade of May, corresponding to the last phase of growth and to earing, fell below 2°C.; (f) with maximum temperatures above 31°C. in the second decade of May to the first decade of June there was a decrease in yield, which was greater in the Libero variety. [See also *Fld Crop Abstr.* 4 : 664]—E.B.

3 SUISSE, P. Amélioration et extension de la culture du blé dur au Maroc. [**Improvement and increase of hard wheat cultivation in Morocco.**] *Terre marocaine* 1951, **25**, 217-18.

Hard wheat is grown on 850,000 ha. yearly in Morocco, mostly by Moroccan farmers, and on the best soils, soft wheat and barley being grown on poorer soils. The yield per unit area, which averages at present 5 q./ha., could be raised by replacing the local varieties now grown by selected varieties, such as 1658, 250 and 0181, recommended by the Centre de Recherches Agronomiques, and by improving cultural methods. The organization established in Morocco for improving this crop is briefly described.—E.B.

4 OLIVA, A. Vecchie e nuove razze granarie montane per la campagna 1951-52. [**Old and new mountain wheat varieties for the harvest year 1951-52.**] *Humus, Milan* 1951, **7**, No. 8, 7-10.

The characteristics and requirements of the wheat varieties suitable for the Italian mountains are briefly described. In recent years the old local varieties, well adapted to the environment but low-yielding, have been gradually replaced by new improved varieties. The wheat varieties from northern Europe proved unsuitable for the Italian mountains. Between 43° and 44° lat. in Italy, at 800 to 1100 m. elevation, Est 72 is the variety mostly grown. New varieties, obtained by crossing Est with Mont Calme, Florence, Vilmorin, Poilu and others, will be introduced into cultivation. These are all hardy varieties, frost- and rust-resistant. In the western Italian Alps, at 45° and 46° lat., some varieties of Swiss selection, mainly Mont Calme 245, are grown. Other wheat varieties selected for the Swiss and French Alps are mentioned.—E.B.

5 AGRICOLTURA DELLE VENEZIE. Nuove varidi età grano. [**New wheat varieties.**] *Agricoltura Venezie* 1950, **4**, 293-4.

The following wheat varieties are briefly described: 0.9 (Norin 2 × Ciro Menotti), 0.14 (Damiano Chiesa × Mentana), R.12 (Allevamento 137/1 ×

S. Giorgio) and Florau [parentage not given].—E.B.

6 Maliani, C. Il San Pastore Strampelli. [**The (wheat variety) San Pastore Strampelli.**] *Agricoltura Venezie* 1950, **4**, 242-5.

San Pastore was bred by N. Strampelli from Balilla × Villa Glori and was later improved by the author. Its cultivation is extending in northern and central Italy. It is also suited to hill soil of medium fertility where it has yielded 54 to 57 q./ha. It has deep roots and tillers well. It is sown at the rate of 160 to 180 kg./ha. San Pastore is more cold- and rust-resistant than Damiano Chiesa and Villa Glori, two wheat varieties extensively grown in Italy.—E.B.

7 Dionigi, A. I frumenti per la montagna. 1. La varietà M.33 A. [**Mountain wheats. 1. The variety M.33 A.**] *Genet. agr.* 1948, **2**, 50-72, bibl. 4, English summary p. 72. [Received 1951] [Sta. Sper. Granicolt. N. Strampelli, Rieti, Italy]

The mountain area under wheat in Italy is about 1,200,000 ha. Wheat varieties for this environment must be cold-resistant. An attempt is made to explain the physiology of cold-resistance in autumn varieties such as Andriolo, Est Mottin and Virgilio. The spring variety M.33 A was obtained in 1945 by crossing Mentana with M.33. In 1948 at Leonessa, Central Italy, M.33 A, sown on 20 March and harvested on 27 July, yielded 29.5 q./ha.—E.B.

8 Wagner, S., and Zweifel, J. La nouvelle variété suisse de froment d'automne Probus. [**Probus, the new Swiss variety of autumn wheat.**] *Rev. romande* 1951, **7**, 17-19. [Eidg. Landw. Versuchsanst., Zürich-Oerlikon (S.W.); Sta. Fédérale d'Essais et de Contrôle de Semences, Mont-Calme, Lausanne (J.Z.)]

Comparative trials were undertaken in 1946-8 to find a wheat which combines the good cultural qualities of Mont-Calme 245 and 268 with the good milling and baking qualities of Plantahof. The performance of these three standard varieties and of new varieties from Zürich-Oerlikon and Mont-Calme has been studied as regards yield, agricultural qualities (winterhardiness, resistance to lodging, resistance to rust, and earliness), milling qualities and baking qualities. The strain 56-96 (pedigree given) best combines these desirable qualities. In the autumn of 1948, this strain was admitted to the official list of Swiss wheat varieties under the name of Probus.—D.B.

9 Torpe, N. V. Resultat från försöken med vårvete vid Sveriges Utsädesförenings Värmlandsfilial 1925-1950. [**Results of trials with spring wheat at the Värmland Branch Station of the Swedish Seed Association.**] *Sverig. Utsädesfören. Tidskr.* 1951, **61**, 95-9.

About forty varieties of spring wheat have been tested. Results obtained from these over a number of years are reported.—R.P.J.

10 Yazicioğlu, T. [**Some experimental work: 12. Hard varieties of Turkish wheat. Research on their technical values with their physical, chemical and technological qualities.**] [Turkish] *Ankara Univ., Fac. Agric.*, Publ. No. 24, 1950, pp. 164. [Received 1951]

11 Pal, B. P., and others. **Registration of improved wheat varieties in India. I. The New Pusa wheats.** *Indian J. Agric. Sci.* 1951, **20**, 165-72, bibl. 1. [Div. Bot., Indian Agric. Res. Inst., New Delhi]

A standard form of description is adopted for the registration of wheat varieties and this is applied to 24 New Pusa wheat varieties. Each variety is classified (in tabulated form) according to 30 ear and grain characters, and 31 vegetative and other characters. A key for identifying the New Pusa wheats is appended.—N.G.S.

12 Pugsley, A. T. **Fifty years of wheat improvement in South Australia.** *J. Dep. Agric. S. Aust.* 1951, **54**, 435-40. [Waite Agric. Res. Inst., Univ. Adelaide]

This report is divided under the following heads: introduction and selection of wheat prior to 1901; problem wheats of 1901 and 1951; wheat breeding at Roseworthy College and the Department of Agriculture; further contributions of private breeders and state Departments of Agriculture; breeding for disease resistance at the Waite Institute; stages in the development of modern varieties.—K.L.

13 Boletin Informativo. Comportamiento varietal de la produccion triguera Argentina, cosecha 1949/50. [**Varietal behaviour of Argentinian wheats, 1949-50.**] *Bol. Inform. Dir. Nac. Granos Elev.* 1951, **12**, 18-40.

The use and distribution of varieties and types of wheat grown in Argentina in 1949-50 are analysed. Massaux No. 5 and Olaeta Homero were the highest yielding hard type wheats with yields of 16.92 and 16.90 q./ha. respectively, although Massaux No. 5 was not officially recommended. The semi-hard type wheats were the highest in yield; of them Klein Acero yielded most (20.87 q./ha.), but very little of it was grown.—N.G.S.

14 BOLETIN INFORMATIVO. Variedades de trigo aconsejadas por el Tribunal de Fiscalizacion de Semillas para la siembra del ano 1951. [**Wheat varieties recommended by the (Argentinian) Tribunal of Seed Subsidization for sowing in 1951.**] *Bol. Inform. Dir. Nac. Granos Elev.* 1951, **12**, 13-17, map 1.

Eighteen wheat varieties, nine hard and nine semi-hard, are recommended for the different wheat growing areas of Argentina. Their comparative resistance to black rust, *Puccinia graminis tritici*, is noted, and the periods for sowing given.—N.G.S.

15 WASHINGTON, Food and Agriculture Organization of the United Nations. **World catalogue of genetic stocks. 1. Wheat.** 1950, pp. 26. Mimeo.

Summarized data are presented of the qualitative classes and disease and insect resistance of genetic stocks maintained at a number of plant breeding and experimental stations in Belgium, Canada, Denmark, Ecuador, Egypt, Finland, Greece, Japan, New Zealand, Norway, the Phillipines, Poland and the USA.—P.J.B.

16 BLAIR, I. D. **Wheat seed testing with reference to covered smut disease, pre-emergence loss, and fungicidal dust coverage.** *N. Z. J. Sci. Tech.* 1950, **32**, Sect. A, No. 4, 1-22, bibl. 17. [Canterbury Agric. Coll., Lincoln]

Wheat seed samples were shown to carry *Tilletia* smut fungi to the extent of 17.4 and 8.9% over two seasons. Procedures have been described for determining the adequacy of fungicidal dust covers and it is recorded that of 185 samples from commercial seed distributors, only 11 revealed the 2 oz. per bushel dust-load claimed for all. The importance of a disinfectant load between 1.5-2.0 oz. per bushel has been emphasized by the results of inoculation experiments with the covered smut and pre-emergence diseases of wheat. Observations have been made on the nature of seed-dusting machinery in use throughout the wheat-producing area of New Zealand; those mechanical features with which efficiency is associated have been outlined. The evidence demonstrates the need for a disinfectant dust-cover standard which comes within official seed inspection requirements and certification.—From author's summary.

17 BLACK, M. A. **The effect of hot-water treatment on the germination of Dreadnought wheat.** *N.Z.J. Sci. Tech.* 1951, **33**, Sect. A, No. 1, 44-8, bibl. 5. [Crop Res. Div., Dept Sci. Industr. Res., Lincoln, N.Z.]

Dreadnought wheat may be partially dormant in some seasons, when it requires a period of after-harvest ripening before it will germinate fully. The dormancy can be broken by moistening the seed and chilling it at 41°F. for 155 hours. Hot-water treatment of the seed during the dormant period increases dormancy and further retards germination. Chilling of treated, dormant seed enables it to germinate rapidly and completely. Hot-water treatment of fully-mature seed has no effect on germination.—Author's summary.

18 BALDACCI, E., and FORLANI, R. Il comportamento delle specie e degli ibridi di *Triticum* alle infezioni di *Claviceps purpurea.* [**The behaviour of species and hybrids of *Triticum* with regard to infection by *Claviceps purpurea.***] *Genet. agr.* 1950, **2**, 247-57, bibl. 3, English summary p. 257.

[See *Fld Crop Abstr.* 2: 186, and Abs. 109] The investigations included over 10,000 inoculations with ergot, *Claviceps purpurea*, isolated from *Secale cereale*, on species and hybrids of *Triticum*. The *Triticum* species tested, namely, *T. vulgare*, *T. durum*, *T. spelta*, *T. dicoccum*, *T. turgidum* and *T. sphaerococcum*, were generally less susceptible than rye to *C. purpurea*. *T. vulgare*, as a species, was on the whole susceptible, but its varieties Novaro, 220 and Lauro Bassi were immune; while Mentana, S. Giorgio and S. Pastore were immune in some trials, but had some infected spikes in others. *T. durum* also showed variable behaviour. The resistance of the hybrids was irregular, so that no conclusions in this respect were reached. Contrary to a previous supposition, sterility did not appear to be correlated with resistance.—E.B.

19 URRIES, M. J. de, and CAÑAMÁS, R. Reacción de una colección de trigos híbridos del Centro de Cerealicultura, a las razas números 14 y 21, de *Puccinia graminis tritici*. [**Reaction of a collection of hybrid wheats from the Cereal Cultivation Centre to races No. 14 and 21 of *Puccinia graminis tritici.***] *Bol. Inst. Invest. agron.* 1951, **11**, 29-47, bibl. 5, English and French summaries pp. 45-6.

The results are given of trials with a number of wheats, bred between 1931 and 1936, at the Spanish Centro de Cerealicultura, carried out to study their reaction during the seedling stage in the hothouse to races 14 and 21 of *Puccinia graminis tritici*. None of the wheats proved to be completely resistant to the two races. Many of them were susceptible to both, and only a few showed a higher, or lower, degree of resistance to one of the two races. The hybrid 205-58-43 and some others obtained from Boomey, Marquillo and L-4 were shown to carry factors of resistance to race 14. The hybrid 103-4-40, as well as some other descendants from H-44 and Aragón 104-178, showed promise for resistance to race 21. Some of the wheats tested reacted differently to different samples or biotypes of the two races.—E.B.

20 JAKUBCINER, M. M. [**A new habitat of wild wheat in USSR.**] [Russian] *Bot. Ž. SSSR* 1950, **35**, 191-2, bibl. 5. [All-Union Inst. Plant Industry, VASHNIL, Leningrad]

Triticum araraticum in Azerbaĭdžan SSR.—M.H.

21 MEDVEDEVA, G. B. [**The biology of development of branched ears in wheat.**] [Russian] *Trudy Inst. Genet.* 1950, No. 17, 192-6, bibl. 3.

The author's experiments have indicated that high temperature is not a factor which hinders the branching of ears. This is contrary to the conclusion of Sharman (*Nature, Lond.* 153, 497-8, 1944), who maintained that short day and low temperature are prerequisites for the development of branched ears. The author's tests with wheat varieties show that the branching of ears is stimulated under conditions of good nutrient supply accompanied by a photoperiod which prevents the plants passing through the light stage of their development. A deficient nutrient supply tends to prevent ear branching.—M.H.

22 POELT, H. Über Entwicklungsbeschleunigung und Aufzucht von Winterweizen im Laboratorium. [**The acceleration of development and rearing of winter wheat in the laboratory.**] *Landw. Forsch.* 1950, **2**, 21-7, bibl. 3. [Bayerische Landesantalt für Pflanzenbau und Pflanzenschutz, München]

Details of treatments for the artificial acceleration of reproduction in winter wheat (variety Tassilo) and the results obtained are tabulated. The treatment described below proved to be the most successful. The seedlings, in petri dishes, were placed for 6 weeks in a low temperature cabinet in which the temperature fluctuated between 1°C. and 3°C. On the 6th day the petri dishes were placed for 2 hrs. per day under a 500 w. lamp in the laboratory, which had a temperature of 20°C. and a high air-moisture content of 80 to 90%. At 6 weeks after sowing the plants were transferred from the petri dishes to pots and placed in the plant rearing room in which the temperature was 20°C. and air-moisture content 80 to 90%. After a further 6 weeks in the rearing room (i.e. at 12 weeks from sowing) the ears appeared and in 16 weeks from sowing the plant was ready for harvesting.—D.B.

23 BONDARENKO, G. K. [**The effect of vernalization and conditions of growth on fertility of hybrid plants obtained from crossing varieties of winter *Triticum vulgare* with those of spring *T. durum*.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **79**, 157 bibl. 2. [Ukrainian Sci. Res. Inst. f Grain Husbandry, Dnepropetrovsk]

The experiments were conducted with (1) t following varieties of winter soft wheats: Ukrain 246, Odessa 3, Lutescens 9, Koveĭl, and (2) t following varieties of spring hard wheats: Mela opus 69, Melanopus 37, Narodnaja. The seed winter wheats was sown (a) unvernalized, autumn (5 to 10 September, 1946), and also (vernalized, in spring (3 to 7 April, 1947). T varieties of spring wheats were sown, unvernalize also on 3 to 7 April, 1947. The vernalized se was subjected to a temperature of 0 to +2°C. f 30 days. The hybrid seeds of the first, second ar third generations were vernalized under the sam conditions as the winter wheats, and grown i spring sowings made at a depth of 5 cm. in 6 15 cm. plots. Results obtained (from seve crossings of the different varieties of *T. vulga* and *T. durum*) are tabulated under the headings viability of F_1 seed; number of F_1 plants (betwee 1 and 50) which produce grain; and productivit (percentage fertile plants and variation in grai number per plant) of the F_2 and F_3 generations

While hybrid plants of the first generatio from crosses of soft and hard wheats are usuall self sterile (or have a lowered fertility), the dat obtained in these experiments show that whe varieties of winter wheat (2n = 48) grown i spring from vernalized seed are crossed with sprin wheat (2n = 28) sown in spring, the hybrid seed i larger and viability greater than that obtaine from crossings of varieties of winter wheat sown i autumn with varieties of spring wheat sown i spring. It is concluded that vernalization of th seed of parental plants and their hybrids, with subsequent rearing of the hybrid generations under different conditions produce an increase in fertility of the *T. vulgare* × *T. durum* hybrids.—M.H.

24 ROMOŠČENKOV, D. D. [**The dependence of energy of tillering of spring wheat on the formation of primary embryonic roots.**] [Russian] *Doklady Akad. Nauk. SSSR* 1951, **79**, 349-52, bibl. 8.

In an experiment with Diamond spring wheat, it was found that on germination the seed with high absolute weight (i.e. the weight of 1000 seeds of an average sample) formed 5 and, in individual cases, 6 primary rootlets each, while seeds with low absolute weight produced for the most part 3 to 4, and only in very few instances 5 primary rootlets each. Plants originating from seeds of high absolute weight had, in addition to a large quantity of roots, a large area of assimilating leaf-surface. The greatest energy of tillering was noted in plants having 8 and 9 primary rootlets. With high tillering energy, the productiveness of the main ears was high.—R.P.J.

25 MOROZOV, P. V. **[The influence of the temperature of the soil on the growth of the root system of spring wheat during the period from sowing to establishment.]** [Russian] *Doklady Akad. Nauk SSSR* 1951, **76**, 293-4, bibl. 7. [Inst. Grain Husbandry, S.E. SSSR, Saratov]

An experiment was conducted from 1947-8 with varieties belonging to 3 sharply differentiated ecotypes of spring wheat: West-Siberian, Central Asiatic and South-Eastern (local). Results relating to the 4 varieties, Erithrospermum 841, Lutescens 62, Lutescens 53/2 and Milturum 553 are reported. Tabulated data show that with a reduction in soil temperature, when the soil contained an adequate amount of moisture, there was an increase in the number and the thickness of the roots, but the degree of branching of the roots was reduced in all the varieties.—R.P.J.

26 SISAKJAN, N. M. **[Metabolism with directed alteration of the nature of plants.]** [Russian] *Izvestija Akad. Nauk SSSR* 1951, No. 2, 30-43, bibl. in text. [Bach. Inst. Brock. Akad. Sci. USSR]

Investigation of ferments of the group of dehydrases, which play an important part in the respiratory processes of the organism, indicated that the activity of the dehydrases of the hard wheats Melanopus 69 and Hordeiforme 10 is one-and-a-half-times to twice as great as that of the soft wheats Lutescens 62 and Milturum 321. The varieties of soft wheats obtained from hard wheats by means of changes in growth conditions for the most part possess very low dehydrase activity compared with the original forms. The measure of the activity of the dehydrases of these altered forms approximates to that of the soft wheats Lutescens and Milturum.—R.P.J.

27 NOULARD, L. Action de certains produits herbicides et insecticides sur diverses plantes cultivées. Note sur l'influence de l'hexachlorocyclohexane (H.C.H.) sur un froment alternatif. **[Action of certain herbicidal and insecticidal products on different cultivated plants. The influence of hexachlorocyclohexane (HCH) on a wheat crop in rotation.]** *Rev. Agric.* 1950, **3**, 480-2. [Sta. Rech. État Amél. Plantes de Grande Cult., Gembloux, Belgium]

Wheat (following oats and sugar-beet) was selected for experiment. Since the experiment was conducted for one year only and on one crop only, the results cannot be regarded as conclusive. Before sowing the wheat a commercial preparation containing 50% HCH was applied to the soil at 15 kg./ha. It produced a slight increase in yield (5.25%). The increase was highly significant and was thought to be due to the stimulation by HCH of certain stages of the cycle of nitrogen fixation in the soil.—D.B.

28 GIACANELLI, E. Ricerche sul contenuto in catalasi di varie razze di frumento. Nota 2. **[Researches on the catalase content of various wheat varieties. Note 2.]** *Ann. Sper. agr.* 1951, **5**, 499-516, bibl. 10, English summary pp. 515-16. [Ist. naz. Genet. per la Cerealicolt. " N. Strampelli " Roma]

[See *Fld Crop Abstr.* 2 : 228.] Research was continued on the grain of 5 wheat varieties, harvested in 1946, 1947 and 1948, in Lombardy, Lazio and Puglia, representing northern, central and southern Italy respectively, with the object of studying the influence of environment and heredity on the catalase content of the grain. The various methods for determining the catalase activity are discussed. Von Euler's method was adopted in this investigation, a total of 3780 determinations being carried out. Results showed that the catalase content is influenced more by environment than by the varietal factor, and that it increased as the latitude decreased. There were differences from one year to another which are attributed to climate. At higher temperatures there appears to be a higher catalase content. The amount of rainfall did not appear to influence the catalase content. With regard to the varietal factor, the 5 varieties maintained the following order, arranged in decreasing values of catalase content: Libero, Novaro, Tevere, Mentana, Roma. This order was the same in all the years and localities, except in the case of Novaro and Tevere, which, however, have very similar catalase values.—E.B.

29 MOSOLOV, I. V., and PANOVA, A. V. **[Some peculiarities in the nutrition of different varieties of spring wheats.]** [Russian] *Doklady Akad. Nauk SSSR* 1951, **78**, 963-6.

Three types were studied: branched wheat, Moskovka, and Lutescens 062. The nutrients, applied at the time of sowing, were given in the following variants: $N_1P_1K_1$, $N_2P_1K_1$, $N_1P_2K_1$, and $N_1P_1K_2$. The data show that the increased dose of N lowers grain yield and general dry-weight of the branched wheat and of Lutescens 062, but in Moskovka these yields were increased by doubling the N supply. The variations in yields produced by the different treatments are tabulated. The work is also concerned with the effect of nutrient supply on content of soluble carbohydrates in leaves of the different varieties; and with the general dry-weight of the plants in relation to soil acidity. There is evidence that branched wheat contains a greater amount of sugars than either of the other two varieties, and apparently this fact is related to the greater susceptibility of this variety in the

Moscow province to attack by pests. The varieties differ in their requirements for lime, branched wheat being the most sensitive to acid soils. An analysis of the ash elements in stems and leaves has shown that the leaves of branched wheat contain more than twice the amount of calcium found in the other varieties. Branched wheat also contains more phosphorus and in studying grain yields these facts should be kept in view.—M.H.

30 CHAMBERS, W. E., and GARDNER, H. W. **The effect of soil calcium on the mineral content of wheat.** *J. Soil Sci.* 1951, **2**, 246-53, bibl. 6. [Roy. Agric. Coll., Cirencester, (W.E.C.), and Herts. Inst. Agric., Oaklands, St. Albans, (H.W.G.)]

The main changes produced by liming on the physical characters and mineral content of Steadfast wheat were increased plant size, decreased concentrations and total contents of manganese and increased concentrations and total contents of magnesium in the plant. Calcium and potassium concentrations were almost unaffected by the liming treatments, although the total content in the plant was increased through increased plant size.—From authors' summary.

31 WYND, F. L. **Availability to wheat plants of iron in very insoluble glass frits.** *Lloydia* 1951, **14**, 1-33, bibl. 7. [Bot. and Plant Pathol. Dept, Michigan State Coll., East Lansing]

Nine differently compounded, very insoluble glass frits were used for the hydroponic gravel culture of wheat to determine whether it was possible to produce an almost insoluble glass frit that would release an adequate amount of iron to wheat plants solely through physical contact of the roots with the frit. Of the frits tested, two, A-9140-3 and A-9140-1, both containing 5% Fe_2O_3, produced markedly superior wheat growth compared to the controls in which quartz was substituted for the frits and 1 ppm of soluble iron was added to the nutrient solution. The results of these trials showed that it was possible to grow high-quality wheat plants in hydroponic cultures with the only source of iron being the contact of roots with the almost insoluble iron-bearing frit, and that such frits may hold promise as a means of supplying micro-nutrients in a slowly-available form to plants growing in the field.—P.J.B.

32 GRANDORI, R. Come si salva il frumento dagli insetti in magazzino. [**How to protect wheat from insects during storage.**] *Ital. agric.* 1951, **88**, 384-91, bibl. 5.

Many cases are described in which stored wheat in Italy was successfully protected from insects, particularly *Calandra granaria*, by dusting the grain with bentonite powder at the rate of 2 to 5 parts per 1000. To have complete success, it is essential to apply the bentonite before insect infestation is advanced. The moisture content of the wheat must not exceed 13%. A preliminary disinfestation of the walls and floor of the storehouse with DDT is desirable.—E.B.

33 BRISLEY, H. R., and JONES, W. W. **Sulphur dioxide fumigation of wheat with special reference to its effect on yield.** *Plant Physiol.* 1950, **25**, 666-81, bibl. [Phelps Lodge Corp., Douglas, Arizona]

The purpose of the experiments was to prove or disprove the theory known as the "measured basis for damage computation". The theory is based on the assumption that each plant type is endowed with a standard number of leaves with which to produce a crop and that if this number is reduced by the action of sulphur dioxide then the yield would be reduced proportionately. Experiments were conducted over a 5-year period in a smoke-free district. From preliminary experiments on different types of plants it was evident that yield loss resulting from sulphur dioxide treatment varied noticeably with the weather different years and that the yield loss differed with each crop. Each plant type was therefore considered separately. As regards wheat, the principal effect of sulphur dioxide was on the leaves and leaf sheaths, the organs on which stomata are most numerous. Plants were affected at any stage of growth. The fully developed, highly functional leaves were the first to show injury and the young, undeveloped blades were quite resistant. The appearance of the injury is not easy to describe. Acute injury is the most common and is caused by breakdown and collapse of the leaf cells. When the dosage is heavy or long-continued the whole leaf blade may be destroyed. If the dosage is mild, the damage, known as chlorotic injury, appears as a yellowing of the leaf caused by loss of chlorophyll. The percentage of foliage area destroyed by sulphur dioxide was correlated with yield and the resulting graphs, based on years' work, provide a guide for the estimation of loss of yield. Leaf area was considered to be truer measure of the manufacturing power of the plant than was number of leaves. Wheat plants sustained less damage by having 15% of their foliage destroyed twice during the season with an interval for recovery, than when 30% of the foliage was destroyed by one treatment. Wheat treated with sulphur dioxide at night sustained no damage even though concentrations were sufficient to produce severe foliage injury in sunlight.—D.B.

34 GREER, E. N. **The milling and baking properties of home-grown winter wheat 1947-1949.** *J. nat. Inst. agric. Bot.* 1951, **5**, 459-63.

A summary is given of the results of milling and baking tests carried out on the 1948 and 1949 crops of 14 recommended varieties of winter wheat harvested from demonstration plots and sub-stations of the N.I.A.B. The tests were carried out at the Cereals Research Station of the National Association of British and Irish Millers, St. Albans, using a standard method. Similar tests were carried out in 1947 and the milling differences between varieties noted then were confirmed in the 1948/49 tests. The main difference noted was that the following wheats gave a granular (hard) flour :—Rivet, Holdfast, Redman, Warden and Yeoman, while the remaining 9 were classified as soft wheats. Milling yields were related to the method of milling employed and are not considered in detail. In the baking trials, wide differences existed between the two seasons' crops. The results of the wet 1948 season are not comparable with the other two years of the survey and may be taken as indicative of varietal response to bad harvest weather. The good conditions of the 1949 harvest and the excellent appearance of the samples were not, however, fully reflected in the general mean score for all loaves, which was 22 compared with 30 for 1947. The most striking differences in bread-making value occurred in the varieties usually accepted as of special value for biscuit making :—Juliana, Steadfast, Victor, and Little Joss. A score of 40 or better corresponds to normal commercial bread and scores below 25 mean that grain cannot be used in quantities greater than 30% of the total grist. Of 384 samples examined, only 9 reached a score of 40 and the general mean of 22 for the 1949 crop indicates that had these wheats been used for milling, a reduction in flour quality must have followed. Further improvement in the bread-making quality of wheat is therefore desirable. Estimations of the percentage of endosperm present in the grain of the 14 varieties showed remarkably little variation, despite differences in grain-size and bushel-weight. Differences between them found in milling are therefore attributed to variation in endosperm texture and, if this is so, attention should be paid to this aspect in the search for improved English wheat varieties.—C.L.S.

35 WATSON, E. R. **A review of the application of statistical techniques to wheat agronomy in Australia.** *J. Dep. Agric. W. Aust.* 1951, **28**, 1-25, bibl. 23.

BUCKWHEAT

36 GRINENKO, P. P. [**The most suitable dates for sowing buckwheat.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 3, 66-72. [Prohorov State Var. Trials, Kursk Prov.]

Results are reported of trials conducted from 1945 to 1949 to determine the most suitable dates for sowing buckwheat (*Fagopyrum esculentum*). In the south-eastern part of the Kursk province, in a dry spring, sowing should be done immediately after the completion of the sowing of early grain crops. In an ordinary spring with frequent showers of rain, comparatively low temperatures and relatively high atmospheric moisture, buckwheat should be sown from 27 May to 3 June.—R.P.J.

37 WORT, D. J. **Effects of non-lethal concentrations of 2,4-D on buckwheat.** *Plant Physiol.* 1951, **26**, 50-7, bibl. 10. [Univ. British Columbia, Vancouver]

Fagopyron esculentum was sprayed with 50, 100, 500, and 1000 ppm NH_4 (2,4-D). Observations and analyses were made at 3, 8 and 12 hours, and 1, 2, 4 and 8 days after treatment. The higher the concentration, the greater were deformation, reduction in leaf area, chlorophyll content, and delay or prevention of opening of flower buds. The T/C dry-weight values decreased with increasing concentration and with time. Total sugar T/C values in stems and leaves rose above 100 within 1 day after treatment, but fell as low as 48 by the 8th day. In roots, sugar values fell continuously. Starch-dextrin T/C values in stems fell immediately after spraying, rose within 12 hours to maxima above 100 and thereafter declined rapidly. T/C values for total N and protein N in stems and roots increased with time and concentration. Little significant change in these values occurred in leaves. [The value T/C was obtained by dividing the percentage of a substance in the treated plants by the percentage of that substance in the control plants and multiplying the quotient by 100.]—Adapted from author's summary.

OAT

38 KRUTIHOVSKIĬ, V. K. [**A naked oat and some measures employed in its cultivation.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 1, 69-70, bibl. 1. [Dmitrovsk State Varietal Trial Grounds]

In 1946 mass selected seed of a local naked oat which had been grown for many years on a collective farm in the Kommunističesk region was sown side by side with glumed varieties. The naked oat yields in 1946 were 17.9 centners (centner = 100 kg.) per ha., and in 1949, 26.6 centners. In 1947, when as a result of heavy storms, losses in glumed oats through shedding of grain were considerable (in the Dunn variety it was 5.1 centners, in Pobeda 7.5 centners and in Moskovskiĭ A-315, 2.6 centners per ha.), the local naked oat exhibited no shedding. In the region north-east of Moscow, where wireworm is a serious pest, the dusting of naked oats with hexachlorane is important and highly effective. To ensure satisfactory storage, the moisture content of naked oats should not exceed 15% (compared with 17% for glumed varieties).—R.P.J.

39 GARDNER, H. W., and HUTCHINSON, J. B. **Variety and manurial trials with winter oats in Hertfordshire.** *J. Minist. Agric.* 1951, **58**, 206-16, bibl. 3. [Hertfordshire Agric. Inst., St. Albans]

In trials during 1944 and 1946-8, the mean grain yield in 14 trials of S.147, Grey winter, Black winter Picton and S.172 oats was 22.36, 21.79, 21.51, 21.32 and 18.99 cwt. per ac., respectively. The average straw yields during 1944-8 at 11 locations for the same varieties were 32.3, 34.1, 34.6, 31.5 and 25.0 cwt. per ac., while the percentages of kernel in the grain were 75.8, 77.5, 76.3, 77.5 and 74.8, respectively. The crude protein content of the kernel on a dry matter basis was highest for S.172, with 15.12%, followed by: Black winter, 15.0; S.147, 14.75; Picton, 14.13; and Grey winter, 13.81%. There were considerable differences between the protein content of given varieties grown at different locations. The yield and kernel content of Grey winter were respectively 1.3 and 1.5%, higher than Black winter, while in protein content of the grain, Grey winter was 6% higher. These results suggest that high grain yields in oats are not necessarily incompatible with high protein contents. In trials in which spring dressings of N were made to the above named varieties, varying yield responses were obtained. Mid-April top-dressings with 2 cwt. per ac. of nitro-chalk resulted in significant increases in the protein content of the kernel, while a further 2 cwt. application of nitro-chalk in mid-June resulted in a further significant increase in protein content, compared with untreated controls. The oil content of the kernel of Grey winter was highest with 9.8%, followed by: S.172, 9.5; Black winter, 9.2; Picton, 9.2; Unique, 9.0; S.147, 7.6; Marvellous, 7.0; Victory, 6.9; and Black Supreme, 6.0%.—P.J.B.

40 BERMEJO, A. Z. Ensayo comparativo num. 2 de variedades de avena. [**Comparative trial No. 2 with oat varieties.**] *Bol. Inst. Invest. agron.* 1951, **11**, 249-54. [Centro de la Cuenca del Duero, Spain]

Eleven oat varieties were tested against the variety Francesca of the Ardennes. Each variety was grown on 3 narrow alternating plots, 20 m. long, sowing taking place on 13th March, 1950. Francesca and Opus, particularly the former, were the most drought-resistant varieties. The heavy rains during the trial caused attacks of rust on the stem and leaves, to which the varieties Ranger and Fulton were the most susceptible. The variety Red Rustproof confirmed its rust-resistance, but was most affected by drought. Grain yields per plot are reported, Francesca taking first place.—E.B.

41 ATKINS, I. M., and COFFMAN, F. A. **Mustang, a hardy new winter oat.** *Agron. J.* 1951, **43**, 287-91, bibl. 11. [Texas Agric. Expt Sta., College Station]

Mustang is a selection of a Lee-Victoria × Fulwin cross made at Aberdeen, Ohio, in 1937. In trials at Denton, Texas, during 1944-50, the average winter survival rates for Mustang, Fulwin, New Nortex and Fultex were 86, 83, 57 and 51%, respectively. Mustang is resistant to crown rust and tolerant to *Helminthosporium victoriae*. It is earlier in maturity and more winter-hardy than New Nortex, the most widely grown red rust-proof variety in Texas, and has outyielded this variety in central Texas. Mustang is particularly recommended for autumn sowings in the central Texas Blackland area where winter killing is most prevalent. The variety is short-strawed, well adapted for combining, and has grey seed with good test weight.—P.J.B.

42 NICHOLSON, G. **Acacia—a new oat variety bred by Department of Agriculture.** *Agr Gaz. N.S.W.* **62**, 294.

A new oat variety to be known as Acacia has be bred at New England Experiment Farm, Ne South Wales. It is a cross between Algerian a Fulghum. Acacia is a late-maturing varie adapted for grazing and grain production, main in the northern and central tableland distric The grain is of excellent quality though a litt short for milling. The new variety is high resistant to smut and moderately resistant to le rust, but is susceptible to Race 8 stem rust. N seed will be available for general distribution th season.—K.L.

43 GRIFFITHS, R. L. **Oat varieties.** *J. De Agric. S. Aust.* 1951, **54**, 371-6.

A descriptive list is given of some 30 oat varietie including (a) those which are already well established under South Australian conditions, and (those possessing special characteristics which mak them worth a trial in this State.—K.L.

44 ÅKERMAN, Å. Några erfarenheter rörand angrepp av fritflugelarver på havre. [**Som experiences concerning attacks of frit fl larvae on oats.**] *Sverig. Utsädesfören. Tidskr.* 1951, **61**, 108-18, English summary.

In Sweden there are three generations of the fri fly (*Oscinis frit*) in a year. The larvae of the firs generation attack seedlings of oats and other cereals as well as fodder grasses, while those of the second generation injure the plant at the time of panicle emergence. The third generation is dangerous only to crops sown in autumn. Frit fly attack may result in a considerable reduction in yield. Early sowing and breeding for resistance are the chief means of diminishing the damage caused by the pest. Trials conducted in 1950 at Svalöf and the Association's branch stations at Kalmar and Ultuna indicate that the most resistant varieties of Swedish extraction are the Central Swedish black oat Stormogul II and Engelbrekt II, and white oats deriving from the resistant German variety von Lochows Gelbhafer.—From English summary.

45 LACROIX, L. Action de certains produits herbicides et insecticides sur diverses plantes cultivées. Influence de certains insecticides sur les emblavures d'avoine. [**Action of certain herbicidal and insecticidal products on different cultivated plants. The influence of certain insecticides on sowings of oat.**] *Rev. Agric., Brux.* 1950, **3**, 478-9. [Sta. Rech. État Amél. Plantes de Grande Cult., Gembloux, Belgium]

The object of study was the effect of the chemical on the crop and not on the pest. The variety of oats used was Blanche du Vieux Moulin and the insecticides were Agrocide 2 at 250 kg., Hexaterre 50 at 15 kg. and Lacasol at 250 kg. per ha. Compared with the control plot there was a slight but non-significant increase in yield of cereal. Lacasol was the only product which caused any vegetative abnormality, and this was only temporary.—D.B.

46 HAMILTON, D. G. **Culm, crown and root development as related to lodging.** *Sci. Agric.* 1951, **31**, 286-315, bibl. 45. [Cereal Div., Exptl Fm Serv., Canada Dept Agric., Ottawa]

Studies were made of the crown portions of 8 oat varieties with different susceptibility to lodging, grown for 3 years at 8 locations which varied widely in environmental conditions, to determine the characteristics, particularly those of the adventitious root system, associated with resistance to lodging. Varieties with high resistance to lodging had culms of greater diameter and larger, more rigid and more widely spread adventitious root systems than those with low lodging-resistance. Varieties with the largest culms had the best root development and the greatest number of adventitious roots. The most important character contributing to lodging-resistance was culm diameter, followed by root type and plant height. Shallow sowing at a depth of 0.75 in. resulted in the production of a better root type than sowings at 3 in. deep. The culm size of plants from sowings at 1 bu. per ac. was significantly larger than that from 3 bu. per ac. sowings. Early sowings tended to produce larger culms and a better root type than late sowings. This was particularly the case where shallow sowings were made at the 1 bu. per ac. rate, and the varieties used were susceptible to lodging. The culm cross-section of varieties resistant to lodging was larger, contained more vascular tissue and a greater area of thick-walled sclerenchyma cells than did the culms of varieties susceptible to lodging. It did not always follow that resistant varieties had a larger number of vascular bundles than susceptible ones. In resistant varieties, the sclerenchyma and the vascular bundles appeared to be closer together than in susceptible varieties. Coronal root structure did not appear to be associated with lodging-resistance. From the results of these studies, it is concluded that lodging-resistance is primarily associated with the anchorage of the plants to the ground, and that in breeding work, the three most important characters in lodging-resistance are culm diameter, root development and plant height.—P.J.B.

47 ŠESTAKOV, A. G., and NOZDRUNOVA, E. M. [**The influence of row manuring with granulated superphosphate on exchange of phosphoric compounds and yield of plants.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **79**, 105-8, bibl. 5. [Timirjazev Acad. Agric. Moscow]

An experiment conducted in 1949 with the Pobeda variety of oats in a grass/arable rotation is described. The results indicated that by the proper combination of basal manuring with row-manuring, using granulated superphosphate, it is possible to create conditions favourable for the growth and development of the plants, to change their metabolism and thereby to raise the yield of cereal crops, and at the same time to improve their quality by increasing the content of protein and phytin in the grain.—R.P.J.

48 LANGSTON, R. **Effects of different concentrations of nitrate on the growth and vitamin content of oat plants.** *Plant Physiol.* 1951, **26**, 115-22, bibl. 12. [The Samuel Roberts Nobel Foundation, Ardmore, Oklahoma]

Oat plants were grown in sand cultures with nutrient solutions containing 2.5, 10, 15, 20 and 22.5 millimoles of nitrate per litre. " The plants that received 10, 15, 20, and 22.5 millimoles of nitrate per litre of nutrient solution, respectively, were very much alike in external appearances, and no symptoms of nitrogen deficiency were visible. All plants of these groups possessed a uniform dark-green colour. All plants grown in the nutrient solution containing 2.5 millimoles of nitrate per litre were stunted and chlorotic, and exhibited uniformly typical nitrogen-deficiency symptoms." Plants grown in the 10 millimole nitrate solution showed significant increase in fresh weight, dry weight, tillering, pantothenic acid and biotin when compared with plants grown in the 2.5 millimole solution. There were significant increases in tillering from all treatments except the 10 and 15 millimole solution. The results of these studies indicate that the amount of nitrogen available to growing oat plants may produce a marked effect upon their vitamin B content.—D.B.

RYE

49 IVAHOV, P. K. [**Concerning the periodical deepening of the ploughed layer of chernozem soils.**] [Russian] *Sovet. Agron.* 1950, **8**, No. 5, 34-40, bibl. 9.

Deep ploughing exerts a favourable effect for not less than 4 years. In experiments at the Bezenčusk Experiment Station, the yield of winter rye on land ploughed to a depth of 20 cm. was 18.2 centners (centner = 100 kg.) per ha.; but with a ploughing depth of 30 cm. it was 21.8 centners per ha., an increase of 18%.—R.P.J.

50 BREMER-REINDERS, D. E. Nieuwe perspectieven voor de roggeveredeling. [**New aspects in rye breeding.**] *Bakkerij-Wetenschap* 1950, **3**, 71-5, English summary p. 75.

Since 1946, work has been in progress at the Plant Breeding Station, Wageningen, on the production of tetraploid rye. Starting in 1946 with colchicine-treated Petusker rye, about 1900 kg. of tetraploid Petusker rye seed were obtained by 1949. This tetraploid rye is a very vigorous plant with broad, thick leaves, stiff straw and a grain about twice as big as that of diploid rye. Where grown at a particular location for the first time, the seed-set of tetraploid rye has not been very satisfactory, but has improved in later years. In the first comparative trials in 1949 in the Northeast Polder, tetraploid rye gave a higher grain yield than Petusker diploid rye. Work is now in progress to improve the characteristics of Petusker tetraploid rye by crossing it with other tetraploid varieties.—P.J.B.

51 ROŽEVIC, R. Ja. [**Monograph on the genus *Secale* L.**] [Russian] *Trudy Komarov Bot. Inst.* 1947, Ser. 1, No. 6, 105-63, bibl. 41, English summary p. 163. [Received 1950]

A study of the systematics and phytogeography of rye species.—M.H.

52 FERWERDA, F. P. Inteelt en heterosis bij rogge. **Inbreeding and heterosis in rye.** *Landbouwk. Tijdschr.* 1951, **63**, 319-30, bibl. 14, English summary pp. 329-30. [Plant Breed. Inst., Agric. Univ. Wageningen, Netherlands]

An account is given of experiments in the open pollination of several inbred lines of rye in an environment which strongly favoured cross-pollination. The frequency of spontaneous crossing varied greatly in the different lines. [Table headings are given in English.]—G.M.R.

53 MICHAEL, G., and WILBERG, E. Untersuchungen über die Stoffaufnahme der höheren Pflanze. II. Die lithiumaufnahme bei Roggenkeimpflanzen. [**Investigations on the intake of substances by higher plants. II. Intake of lithium by rye seedlings.**] *Z. PflErnähr. Düng.* 1951, **52**, 242-58, bibl. 25. [Univ Jena]

BARLEY

54 SISLER, W. W., and OLSON, P. J. **A study of methods of influencing lodging in barley and the effect of lodging upon yield and certain quality characteristics.** *Sci. Agric.* 1951, **31**, 177-86, bibl. 12.

Experiments were carried out over 3 years to determine the effect of seed-rate and spacing on lodging and yield, and the effect of artificial lodging, with straw laid either flat or at 45°, on yield, 1000-kernel-weight, bushel-weight and nitrogen percentage. Heavier seed-rates (2 and 2.5 bu./acre) and wider row spacings (15 in.) increased lodging and reduced yields. When guard rows of strong-strawed varieties were used, lodging in the plots was reduced and yields increased. Artificial lodging reduced yields, 1000-kernel-weight and bushel-weight, but increased nitrogen percentage. These effects were more pronounced when the degree of lodging was increased from 45° to 90° and when the time of lodging was advanced from 20 days after heading to the time of heading itself. —C.W.S.H.

55 DOBBEN, W. H. van. Enkele beschouwingen naar aanleiding van veldproeven met mengcultuur. [**Observations on field trials of barley-oats mixtures.**] *Maandbl. LandbVoorlDnst* 1951, **8**, 89-100. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

The growing of oats and barley mixed has become increasingly popular in the sandy regions of the Netherlands, principally because of the difficulty experienced in harvesting summer barley when it is grown alone on such lands. An account is given of a preliminary trial of an oats-barley mixture conducted by the Central Institute in 1950 together with a summarized account of earlie trials (1939, 1940 and 1946) conducted by th

Advisory Service at Arnhem. Results are discussed with special reference to the yield of the mixture in comparison with that of the components when grown alone, and it is found that in this respect no definite conclusions can yet be drawn. It is advisable, however, to use an early-ripening oat variety so that harvesting may be early, and a productive barley variety suitable for sandy soil. In regard to soil requirements, those of the barley must receive the first consideration.—G.M.R.

56 EARNSHAW, F. **Trials of spring barley varieties Earl and Plumage-Archer 1943.** *J. nat. Inst. agric. Bot.* 1951, **5**, 431-3.

The trial results are presented of 2 varieties of spring barley grown during the six seasons 1942-8. The two varieties and their origins were :—Earl, selected from Spratt-Archer at the Cambridge University Plant Breeding Institute, and Plumage-Archer 1943, selected by the late Dr. Beaven from a cross between Spratt-Archer 37/3 × Plumage-Archer 1935. The randomized block layout using Spratt-Archer as the control was adopted for all trials, the majority of which were carried out at Cambridge and at 6 outstations. In 1945, and subsequent years, additional trials were conducted on farms in Yorkshire. From a summary of the results Earl consistently came into ear 7-10 days earlier and ripened about a week before Spratt-Archer. Earl has been added to the recommended list as a variety of the Spratt-Archer type which may be preferred to that variety in late districts, or in other circumstances, where earliness of ripening is of first importance. Plumage-Archer 1943 showed no marked differences in field characters when compared with Spratt-Archer and showed a strong resemblance in nearly all characters to the earlier stocks of Plumage-Archer.—C.L.S.

57 THOMPSON, E. G., and BELL, R. A. M. **Trials of the spring barleys :—Freja, Balder, H. H. 11/10 Cult 6, Rigel and Ymer in the years 1946/1949.** *J. nat. Inst. agric. Bot.* 1951, **5**, 417-21.

The trial results are presented of 5 Scandinavian-type spring barleys grown during the four seasons 1946-49. The varieties under test were :—Freja, the product of a cross between Victory and Opal made at the Svalof Plant Breeding Institute, Sweden ; Balder, the product of a cross made by Messrs. Weibulls, Sweden, parents (Gull × Land Race) × Maja ; H.H. 11/10 Cult 6, a selection from a cross between Goldthorpe and Kenia produced by Dr. Hunter of the Cambridge University Plant Breeding Institute ; Rigel, a cross between Kenia and Maja produced at Abed in Denmark ; and Ymer, a cross between Maja and Svalof 34/22 (Victory × Opal) made at Svalof. The trials, using the randomized block layout, were laid down at Cambridge, at 9 out-stations, and on farmers' fields in Yorkshire (from 1947), in Devon (from 1948) and in Gloucester (from 1949). The control variety, in each case, was the Danish barley Kenia. From an analysis of the trial data it is concluded that all 5 barley varieties were in the same class as Kenia, having shorter straw and earlier maturity than most English varieties. Varietal differences were small, except in the case of Freja, which was outstandingly earlier than the others. It also gave a slightly higher average grain yield than Kenia. Freja has been added to the recommended list, provisionally, as being suitable for districts where earliness is an advantage and for fertile soils.—C.L.S.

58 UTAH Agricultural Experiment Station. **Biennial Report, 1948-50.** Logan, 1950, pp. 62.

Barley breeding, pp. 9-10. Bonneville, a new spring barley variety was released in 1951. It is adapted to fertile, irrigated soils and has outyielded 25 of the leading varieties in trials at a number of locations. An extensive list is given of the research projects in progress at the Station.—P.J.B.

59 GUSTAFSON, P. R. **A rapid method for determining the viability of barley.** *Cereal Chem.* 1951, **28**, 343-6, bibl. 7. [Osborne McMillan Elevator Co., Minneapolis, Minn.]

The method detailed gives results within 35 min. of starting the test and is suitable for determining the viability of whole, unpearled barley grains. The grain is treated with phosphoric acid, benzidine, and hydrogen peroxide containing sodium chloride, in that order. The grains are then rinsed in distilled water and covered with Skellysolve B, or F. All kernels showing their original colour, or a true yellow, are considered viable. Dead kernels show an orange tinge, usually covering ¼ to ½ of the kernel. Where the kernel is damaged, an intense blue or purple colour appears.—P.J.B.

60 TYNER, L. E. **Control of loose smut of barley by chemical and physical treatments.** *Sci. Agric.* 1951, **31**, 187-92, bibl. 4.

Seed infected with loose smut, *Ustilago nuda*, was soaked for 6 hours at room temperature and then placed in chemical solutions for 18, 22 or 27 hours. Other infected seed was germinated and placed in the solutions from 1 to 4 hours before sowing. Twenty-four solutions were used. After treatment 200 seeds were sown and a month later the total number of plants and smutted plants were counted. Boric acid, Spergon and potassium iodide effected good control of loose smut ; but Spergon caused the least mortality of healthy seed. In a further test a 0.2% Spergon solution, in which the seed was soaked for 40 hours, was used. As a result only one plant out of 489 was smutted. When supersonic vibrations of frequencies 1.25 and 2.5 meg./sec. were passed through a steel tank containing infected seed, the number of infected plants was significantly reduced, but not to an extent which would be of practical value. A frequency of 2.5 meg./sec. for 4 minutes, with seed and water agitated during treatment, gave the best result.—C.W.S.H.

61 KUPERMAN, F. M. [**Development of barley of an intermediate type, *Hordeum intermedium* Vav. et Orl., from the subspecies *Hordeum vulgare* L. and *H. distichum* L.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **75**, 131-3, bibl. 6. [Lomonosov State Univ., Moscow]

MAIZE

62 EYNDEN, G. P. A. van den. Mogelijkheden en moeilijkheden bij de maïsteelt. [**Possibilities and difficulties in the cultivation of maize (in Holland).**] *Nieuwe Veldbode* 20th Jan., 1949, 3. [Wageningen Netherlands]

General information is given on the present position of maize-growing in the Netherlands, the value and uses of the crop, its place in farm management, mechanized harvesting and its limitations, and the possible usefulness of American hybrids compared with cross-pollinated varieties already bred in the Netherlands. Although a relatively new crop (1934 onwards) and still in the experimental stage, maize has proved its worth, especially in the sandy regions of the country. The area grown is steadily increasing (4700 ha. in 1948). Of American hybrids under trial, the medium early Wisconsin 240 ripens sufficiently early under Dutch conditions and lends itself to mechanical harvesting. Seed of this variety, both imported and local, is available. —G.M.R.

63 RATTRAY, A. G. H. **Maize. Hints for the new farmer.** *Rhod. agric. J.* 1951, **48**, 123-34.

This illustrated article describes the preparation and manuring of the land, also the seeding and harvesting of maize in S. Rhodesia. Several of the most popular open-pollinated and hybrid varieties are mentioned and notes are given on the diseases and pests of the crop.—K.L.

64 CALDWELL, A. C. **More corn at no extra cost.** *Better Crops with Plant Food* 1951, **35**, 11-16, illus.

The relationships between number of stalks per hill, rate of fertilizer application, yield and ear size were determined on maize grown on four widely differing soil types in Minnesota. Increasing the number of stalks per hill reduced ear size in all cases; but the number of stalks per hill for optimum yield was found to depend on the soil type and level of manuring. In general, light or freely draining soils could support fewer stalks per acre than heavier or more water-retentive soils, but in certain cases the optimum number of stalks per hill was increased through fertilizer applications.—C.W.S.H.

65 STRINGFIELD, G. H., and THATCHER, L. E. **Corn row spacing and crop sequences.** *Agron. J.* 1951, **43**, 278-81, bibl. 17. [Ohio Agric. Expt Sta., Wooster]

The difficulties associated with the maize/wheat rotation in Ohio are discussed. They centre round the fact that, in order to leave the maize long enough in the field for the ears to dry sufficiently for safe farm storage, wheat sowings must be delayed by about one month, while the growing of early maize varieties leads to low maize yields. The studies reported were made to determine the effect on maize yields of row widths wide enough to permit the sowing of wheat between the maize rows. Maize row widths used ranged between 30 and 80 in. and the soils on which the maize was grown varied widely in fertility. Where soil conditions were such as normally produce a 30 bu. per ac. grain crop, yields dropped progressively as row widths increased above 30 in.; but where the soils normally produced a 70 to 100 bu. per ac. crop, grain yields did not decline until row widths increased beyond 50 in. For 60 and 70 in. row spacings, grain yields declined by an average of 4 and 9 bu. per ac. Where wheat was sown between maize rows, its yield was approximately the same as that sown on disced maize stubble. Early July sowings of *Lolium multiflorum* or alfalfa in maize rows 60 to 70 in. wide were very successful. It is suggested that maize row spacings of 60 to 70 in. without reducing the normal stand density per ac., and the sowing of wheat in the interlines, may permit farmers in the eastern USA to adopt a maize/wheat rotation using a full-season maize variety without delaying the wheat sowings.—P.J.B.

66 MALIANI, C. I mais ibridi nel Veneto. [**Hybrid maize in the Veneto (Italy).**] *Agricoltura Venezie* 1950, **4**, 81-6.

The Veneto is the most important maize-growing region in Italy. Preliminary trials carried out in this area with hybrid maize from the USA were unsuccessful because the hybrids employed were not suited to local conditions. Short, early varieties suited to soils of medium or low fertility are often required in Italy. In further trials, conducted in 1949, hybrid maize varieties proved to be more productive than local varieties. Results obtained at the experimental field station of Badia Polesine are tabulated. In this district the hybrid varieties did not suffer attacks by Pyralidae nor were they more affected by dwarfing (see *Fld Crop Abstr.* 4 : 357) than the local varieties. Hybrid maize is particularly recommended for deep, fertile, cool soils. The phytotechnic stations of Badia Polesine and Montagnana have begun breeding maize hybrids from local varieties to obtain deep-coloured flint types which are more appreciated locally for human consumption than the American pale, dent types.—E.B.

67 SPAIN. Instituto Nacional Para la Produccion de Semillas Selectas. Experiencias con maices híbridos americanos. [**Experiments with American hybrid maize.**] *Bol. Informativo, Madrid* 1951, **4**, 41-3.

In Pamplona, Spain, the variety Huey's H-75 gave the highest yield, out of 49 hybrids tried, with 50 q./ha. Most of the varieties tried were later in maturing than the indigenous types, only six being earlier. At Zaragoza, under irrigation, Twin B-38 A was the highest yielder (51 q./ha.) amongst 25 early-maturing varieties, Twin D-56 (56 q./ha.) the best of 25 medium-maturing varieties, and Clyde B-31 (51 q./ha.) the highest yielder amongst 49 medium- and late-maturing varieties. —N.G.S.

68 WISCONSIN University. Bull. 476. **Wisconsin corn hybrids.** By *N. P. Neal* and *A. M. Strommen.* 1948, pp. 35. [Received 1951]

The objectives and progress of the hybrid maize breeding programme at the Wisconsin Station are reviewed. The work includes breeding for spring cold tolerance, resistance to seedling blights, smuts, stalk and ear rots, the northern corn rootworm, the corn leaf aphid and the European corn borer. A brief description is given of the pedigree, maturity and characteristics of the principal Wisconsin maize hybrids, as well as practical recommendations for weed and insect control and the control of insects in stored maize grain.—P.J.B.

69 NAUNDORF, G., and SERRANO, C. Contribucion al tratamiento de semillas de maiz para aumentar y asegurar la cosecha. [**Seed treatment of maize to increase and assure the harvest.**] *Acta Agron., Palmira* 1951, **1**, 87-92, bibl. 27, illus., English summary p. 91. [Fac. Agron., Univ. Nacional, Palmira, Colombia]

Seed of the maize variety Cuba-Colombia were tested with : (1) the mixture of nutritive substances and trace elements known as Porro, and Semesan ; (2) Porro plus Semesan plus the copper salt of α-naphtha acetic acid ; and (3) Porro plus Semesan plus the copper salt of 2,4-D. The second and third treatments gave yield increases of 25.2% and 26.4% over the controls, and oil increases in the grain of 14.9%.—N.G.S.

70 GOULD, C. S., and ALDRICH, R. J. **Four years results with calcium cyanamide for weed control in corn maize.** *Proc. 5th Northeastern Weed Control Conf.* 1951, 225-9. [New Jersey Agric. Expt Sta., Rutgers]

On loamy sand soils, applications of 400 lb. per ac. of granular calcium cyanamide gave significant reductions in weed stands and significant increases in grain yield, compared with untreated controls. There were no significant differences between the weed control obtained following applications of cyanamide at the time of sowing and those applications made 4 or 7 days later. On heavy soils, those of high fertility, or wherever plant populations were low (5000 to 7000 per ac.) the cyanamide applications were ineffective, both in terms of weed control and grain yield increases.—P.J.B.

71 CHABOUSSOU, F., and others. Essais de désinfection du sol contre les larves de taupins nuisibles au maïs dans le sudouest. [**Soil disinfection trials for the control of larvae of click beetles injurious to maize in the southwest** (**of France**).] *C. R. Acad. Agric. Fr.* 1951, **37**, 39-42, bibl. 4. [Sta. Zoo. Agric. Sud-Ouest, Pont de la Maye, Gironde]

72 TATUM, L. A., and KEHR, W. R. **Observations on factors affecting seed-set with inbred strains of dent corn.** *Agron. J.* 1951, **43**, 270-5, bibl. 10. [Kansas Agric. Expt Sta., Manhattan]

In order to provide more information on the ways in which drought affects maize plants and the characters responsible for drought resistance, studies were made of the seed-setting ability of different inbred maize lines when selfed at different times of the day and under different conditions of temperature and relative humidity. Under favourable conditions [not specified], pollinations made late in the day were more successful than those made early in the day, though under unfavourable conditions this tendency reversed itself. When favourable conditions occurred following a hot, dry period with low relative humidity, there was an immediate recovery of seed-setting ability. Relatively good seed setting was obtained on days when the temperature exceeded 100°F., but only when the relative humidity did not at the same time fall below 60%. It is suggested that temperature and relative humidity have an indirect effect on pollination by reason of their effect on the evaporation and transpiration of the plants and thus on their turgidity. There were indications that moisture deficiency in silks, with resulting inability to cause pollen to germinate, may be more important in causing poor seed-set than lack of viability in the pollen.—P.J.B.

73 GALINAT, W. C., and NAYLOR, A. W. **Relation of photoperiod to inflorescence proliferation in *Zea mays* L.** *Amer. J. Bot.* 1951, **38**, 38-47, bibl. 40. [Connecticut Agric. Expt Sta. and Yale Univ., New Haven, Conn.]

Continuous vegetative growth through the normal growing season has been attributed to a recessive gene known as the *id* (indeterminate growth) gene. An excessively vegetative plant appeared in a Connecticut maize inbred (C31 stock). Preliminary studies have been made on the light requirements of C31 *id* maize and they indicate that a definite size, age, or number of leaves must be present on the developing plant before floral initiation can occur in this strain. " The critical light-dark period for young plants of this variety is approximately 13 hr. of light—11 hr. of dark. With increase in age, however, there is a slight change in critical day length and a shorter dark period is required. Following photoperiodic induction to flower, proliferation occurs in the staminate inflorescence if the photoperiod is greater than 15 hr. per day. When the photoperiod is between 11.5 and 12.5 hr. per day nonfertile flowers are produced. A light period of approximately 10.5–11.5 hr. per day subsequent to floral initiation seems to be necessary for normal staminate flower development when growth of the inflorescence primordium is uninterrupted. Proliferation of the spikelet results from terminal and intercalary meristematic activity of the rachilla. This axis which is ordinarily indeterminate in the maize spikelet will, under proper photoperiod conditions following induction to flower, assume the generative activities of an ordinary stem and produce a plantlet with adventitious roots. These propagules will root vigorously in nutrient solution and can be readily grown to maturity. Length of the photoperiod during development of the floret has a strong effect upon the degree of vegetativeness of the floral parts of C31 *id* maize."—D.B.

74 BIANCHI, A. Nota preliminare sulla fioritura di popolazioni di granoturco. [**Preliminary note on the flowering of maize populations.**] *Genet. agr.* 1950, **2**, 276-84, bibl. 2, illus., English summary p. 284. [Cent. Genet. Cons. naz. Ric., Univ. Pavia, Italy]

A plot of the early maize variety Marano Vicentino and another of the late variety Nostrano dell'Isola were examined for flowering. With regard to both male and female flowering, all the Marano Vicentino plants flowered within 15 to 16 days from the start of flowering in the plot, while in Nostrano dell'Isola this period was 22 to 23 days. The time-interval between the male and female flowering was short in the early variety and longer in the late variety. A hybrid between these two varieties showed an intermediate, but irregular, behaviour. —E.B.

75 LOUSTALOT, A. J., and FERRIER, R. **The effect of some environmental factors on the persistence of sodium pentachlorophenate in the soil.** *Proc. Amer. Soc. Hort. Sci.* 1950, **56**, 294-8, bibl. 2. [Fed. Expt Sta., Mayaguez, Puerto Rico]

The results of greenhouse experiments, in which flats of soil were treated with 30, 60 and 90 lb. per ac. of sodium pentachlorophenate and stored for 0, 0.5, 1 and 2 months before being sown to maize, indicated that the toxicity of the herbicide decreased with the passage of time. The toxicity of the herbicide decreased more rapidly at 45° than at 10°C; the toxicity of 0.5 lb. per ac. applications persisted for at least 2 months at the 10°C. storage temperature. The toxicity of the herbicide when applied to air-dry soil did not apparently decrease with the passage of time. Toxicity persisted longer in heavy clay than in sandy, or sandy clay soil and longer in soils containing moderate amounts of moisture than in saturated soils.—P.J.B.

76 GEORGIA Agricultural Experiment Station. **Fertilizer trials with maize.** *Georgia Agric. Expt Sta.* 62nd Ann. Rep. 1949-50. 1950. pp. 25-6.

In field trials at a number of locations in the Coastal Plain and Piedmont regions of Georgia, applications of 32, 64 and 128 lb. N per ac. were made to maize grown in stand densities of 8000, 10,000 and 12,000 plants per ac. In all cases, K and P were each applied at rates of 60 lb. per ac. Increasing the stand density from 8000 to 10,000 plants per ac., resulted in an average grain yield increase of 2 bu. per ac. Increasing the rate of N application from 32 to 64 bu. per ac. resulted in an average yield increase of 6 bu. per ac., while a further increase in the rate of N application of from 64 to 128 lb. per ac., raised grain yields an additional 3 bu. per ac. Ear size increased from an average of 0.384 to 0.415 lb. for the 32 and 128 lb. per ac. treatments and decreased from 0.408 to 0.399 as stand densities were increased from 8000 to 12,000 plants per ac. Increasing the rate of N application from 32 to 128 lb. per ac., increased the protein content of the grain by approximately 1%.—P.J.B.

77 Farmers' Weekly, Bloemfontein. **Fertilizer trials with radio-active superphosphate.** *Fmrs' Wkly, Bloemfontein* 1951, **81**, July 11th, 45.

Experiments at the Agricultural Research Institute, Pretoria, on tracer technique, using radioactive superphosphate as a fertilizer for maize, have established that only 2% of the phosphorus taken up by the maize plant was derived from the fertilizer added as superphosphate. A relatively high uptake of fertilizer phosphorus was found in the case of row-placed as against broadcast superphosphate, but only in the initial stages of growth.—K.L.

78 Hamilton, T. S., and others. **The dependence of the physical and chemical composition of corn on soil fertility and cropping system.** *Cereal Chem.* 1951, **28**, 163-76, bibl. 12. [Animal Nutr. Div., Illinois Univ., Urbana]

Analyses were made of samples of maize grain taken from the 1946 harvest of 5 maize hybrids grown on plots at Urbana, Illinois, on fertile silt-loam, on some of which maize had been grown continuously since 1876 with no manurial treatment, and on other plots on which a maize/oats/red clover rotation had been followed since 1901, some plots having received manurial treatment. The yield of one plot under continuous maize was 10.6 bu. per ac., compared with 123.3 bu. per ac. for a plot under rotation receiving lime, farmyard manure and bone phosphate, with 100-kernel dry weights of 22.25 and 31.38 g., respectively. The percentages of floury and horny endosperm of the whole kernel of the grain from the two plots were 59.8 and 25.2 and 34.2 and 50.6 respectively. The kernel weights, total crude protein, zein N, fat, total P, and P present as phytic acid, were significantly higher in the plots under rotation than in the plots under continuous maize, while the nicotinic acid and glutelin N contents were lower. The grain from plots under rotation was markedly lower in tryptophane and lysine and higher in zein content than grain from the plots under continuous maize and was consequently of relatively low nutritive value.—P.J.B.

79 Indo-China, Archives de l'Institut des Recherches Agronomiques No. 5. Le maïs hybride aux États-Unis d'Amérique. [**Hybrid maize in the USA.**] By *J. Le Conte.* Saigon, 1950, pp. 187, bibl 107, illus.

An account is presented of the information collected by the author during a mission to the USA from June to October, 1949, the object of the mission being to study the methods of maize breeding and selection in that country with a view to introducing them into the Union of Indo-China. The report deals mainly with the genetics of maize and its practical applications. The subject matter of the various chapters is :—origin, genetics and heterosis of maize ; methods of maize selection ; production of commercial maize seed ; field trials with maize. This last chapter is concerned mainly with problems of density, manuring, the pest *Pyrausta nubilalis* and fungus diseases. An economic study of maize in the USA ends the report.—E.B.

MILLET AND SORGHUM

80 Elentuh, M. E. [**A new variety of millet (*Panicum miliaceum*) for the Primorskaja Territory.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 4, 47-9.

The new variety, Ilyičevskoe, was bred by the Primorskaja State Selection Station from local types by individual selection. The panicle is ramose, green in the unripe form, 22 to 28 cm. long, with long, drooping branches ; anthocyanin pigmentation is absent. The seeds are brown and small, the 1000-grain weight being from 4.6 to 5.3 g. Average litre-weight of grain is 736 g., with fluctuations from 725 to 742 g. Husk percentage is 19 to 20. The growing period varies from 77 to 87 days. Data show that the low yields of millet in the Territory are mainly due to the lack of varieties suited to local conditions. By using seed from the Ukraine, low yields were obtained, but with the new variety Ilyičevskoe yields have been from 20 to 25 centners (centner = 100 kg.) per ha.—R.P.J.

81 Lupori, N. La saggina per granate. [**Sorghum for brooms.**] *G. Agric. Domen.* 1951, **61**, 272.

The cultivation of broom corn, *Sorghum saccharatum*, for brushes, for which there is a demand for export, is increasing in Tuscany, particularly in the Pisa province. Different varieties are grown in the various districts. It is drought-resistant. Its cultural methods, which are similar to those for maize, are briefly described. It is sown in April-May at the rate of 10 to 12 kg./ha. The variety Sessantina ripens in about 60 days. From one hectare of moderately fertile, well-manured land it is possible to obtain 20 to 25 q. of grain, 15 to 20 q. of broom fibre 1 m. long, and 25 to 30 q. of dry stems.—E.B.

82 Leiboff, R. O. Comportamiento de sorgos graniferos en Guatraché. [**Behaviour of grain sorghums in Guatraché (Argentina).**] *Argentina. Memoria de la 3rd reunion de plantas forrajeras* 1950, 99-106. [Esta. Exptl, Guatraché]

Variety trials carried out at Guatraché during the years 1946-1950 demonstrated the superiority of the United States dwarf and double dwarf sorghums, especially Double Dwarf Yellow Sooner Milo, Martin Milo, Midland, Double Dwarf Sooner and W. Blackull × Day. It was demonstrated that grain sorghums are better than maize for the pampas, where the annual rainfall is below 550 mm.—N.G.S.

RICE

83 INDONESIA, General Agricultural Research Station, Bogor. Contr. No. 112. **Research on rice irrigation.** By *G. A. W. van de Goor.* 1950, pp. 34.

The author discusses, in detail, the role of water in rice cultivation, with particular emphasis on the wet cultivation of the soil, since this is the main feature in which the cultivation of sawah rice (flooded rice) differs from that of irrigated rice. Field trials were carried out to determine the influence of the water content of the soil at the time of cultivation on rice yields. Where an excess of water was present during tillage (sawah rice), Mas and Gendjah ratji rice yielded 26.9 and 25 q. per ha. of grain, respectively ; where the soil contained sufficient moisture during tillage to satisfy its field capacity, yields were 20.7 and 13.6 q. per ha., respectively, significantly less than that of the sawah plots. In order to determine the net amount of water required to produce good yields of sawah rice on a given soil, an experiment was laid out near Bogor, records being kept of the water supply to the plot, the run-off and the rainfall. A considerable amount of water (4.67 1./ha./s.) was needed to produce the desired puddled condition of the soil during tillage. The subsequent water requirements fluctuated widely, though there was evidence of an increase in water requirement up to the time of flowering, after which the need decreased. During 142 days flooding, the average water consumption was 2.63 1./ha./s. The soil on which the crop was grown was a light laterite, with a high percolation rate. The highest rate of percolation (3.64 1/ha./s.) and total water use occurred after the period of desiccation (weeding period). Transpiration by the crop during its life comprised only a small proportion of the total water consumption. The combined rate of consumption by evaporation and transpiration varied from 0.25 to 0.5 1/ha./s. Two varieties were planted on the plot, Djalen and Solo, which gave an average yield of 13.89 q. per ha. of grain and 16.62 q. per ha. of straw. To produce 1 kg. of sun-dried dry matter, 9.3 cu. m. of water were required. Rice yields were low as a result of insect damage, but it is thought that this did not materially affect the validity of the results.—P.J.B.

84 KOLBÉ, F. **Rice cultivation in South Africa.** *Fmg S. Afr.* 1951, **26**, 181-3, 193.

85 RICE JOURNAL. **A review of water-seeding methods** [**for rice**] **in Texas.** *Rice J.* 1951, **54**, No. 2, 11-12.

86 HIRSCHORN, J. El arroz en las islas del delta Paranaense. [**Rice in the islands of the Parana delta.**] *La Chacra* 1951, **21**, No. 248, 10-11, 68, illus. [Inst. Arroz, Fac. Agron. La Plata]

Small-scale experiments using the rice varieties Chacarero F.A. and Precosur 1 F.A. showed that rice can be successfully grown on the islands of the Parana Delta. These islands are well-situated from an economic point of view.—N.G.S.

87 RICE JOURNAL. **Rice varieties in Louisiana 1950 and 1951.** *Rice J.* 1951, **54**, No. 2, 16-18.

A review is given of the less important rice varieties and the prospects for new varieties. The three standard varieties for Louisiana remain Zenith, Bluebonnet and Rexoro.—N.G.S.

88 EL SALVADOR, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 10. Aumente su producción de arroz sembrando la variedad Fortuna. [**Increase your rice production by sowing the variety Fortuna.**] By *J. M. Argueta.* 1950, pp. 3.

Fortuna is an outstanding variety of rice for El Salvador. It was developed from the variety Pachaim, brought from Formosa in 1905. Optimum spacing is 50 × 25 cm., with 5-6 grains per hole and an average seed-rate of 45 lb. per acre. It should be sown in June, for harvesting in November. It takes 152 days to mature. Seed should be treated with Granosan or Agrosan-GN at rates of 1.5 or 5.5 oz. per quintal respectively in order to protect it from *Helminthosporium oryzae. Laphygma frugiperda* can be controlled by dusting with either 10% Gammexane or 5% DDT.—N.G.S.

89 ISAMU MORIMOTO. [**On the yielding efficiency of paddy rice in Japan. Kinki province and its adjacent prefectures.**] [Japanese] *Mem. Hyogo Univ. Agric. Agron.* Ser. No. 1. 1950, **1**, pp. 55, English summary pp. 5-6.

Data are given, in tables and graphs, of the varietal characteristics of over 4300 Japanese rice varieties emanating from the prefectures of Hyogo, Shiga, Kyoto, Nara, Mie, Wakayama, Osaka, Okayama and Tottori.—N.G.S.

90 KONDŌ, M., and others. Untersuchungen der verschiedenen Reiskörner geringerer Qualität. VI. Die Reiskörner der durch die Dürre stark beschädigten Missernten.

[**Examination of several rice grains of poorer quality. VI. Rice grains of the crops which failed owing to drought.**] *Ber. Ōhara Inst. landw. Forsch.* 1943, **9**, 156-69, bibl. 3. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

Severe drought, such as that which occurred in 1939, often recurs in Japan. Twelve samples of hulled and unhulled grain which had been damaged by drought were examined for size, colour, weight, germinating capacity, resistance to breaking and to crushing, taste, chemical composition, chemical reactions and cooking qualities. The results are tabulated.—D.B.

91 CAMPACCI, C. A. O "carvão verde" do arroz. [**Green smut of rice.**] *O Biol.* 1951, **17**, 72-4, bibl. 4, illus.

Carvão verde [green smut] of rice is a fungus disease caused by *Ustilaginoidea oryzae*. Experiments showed that seed treatments with Arasan, Mergamma, Upsulun, Abavit, Semesan, Spergon and copper carbonate, and also with the local practice of immersing the seed in warm or cold brine, were ineffective as control measures.—N.G.S.

92 NILES, J. J. **Hybridization methods with paddy.** *Trop. Agriculturist* 1951, **107**, 25-29, bibl. 5, illus.

An emasculation technique, which consists of clipping off all the anthers and the upper half of the glumes in one operation, is described.—N.G.S.

93 GERMEK, E. B., and others. Estudo do sistema radicular do arroz. [**Study of the root system of rice.**] *Bragantia* 1950, **10**, 89-92, bibl. 2. English summary p. 92. [Inst. Agron., Campinas, Esta. de São Paulo, Brazil]

The root systems of the five rice varieties Pérola, Iguape-catete, Fortuna, Dourado-agulha, and Iguape-agulha grown under upland conditions were studied. It was found that 66% of the roots occurred within 5 cm. of the surface and that 95% of the roots occurred within 15 cm. of the surface. The variety Iguape-catete tended to develop a slightly deeper root-system than the others.—N.G.S.

94 GADADHAR MISRA. **Photoperiodic response in some early varieties of paddy.** *Curr. Sci.* 1951, **20**, 209-10, bibl. 7.

The photoperiodic responses in the four early rice varieties T. 136, T.N. 22 (Rajbhog), T.N. 27 (Banki) and Ch. 10 (Tandwa White) were studied. The application of short-day (10 hr.) photoperiods had a significant delaying effect on first panicle emergence. Exposure to 10 hr. photoperiods for 30 days induced a delay of 5-9 days (according to variety), while exposure to 10 hr. photoperiods till heading induced a delay of 8-15 days. Where the short-day treatment was prolonged till heading the ears of the main shoot did not emerge from the root in 50% of the plants of varieties, T. 136 and T.N. 27, in 42% of T.N. 27, and in 21% of Ch. 10. —N.G.S.

95 HORA, S. L. **Fish culture in rice fields.** *Curr. Sci.* 1951, **20**, 171-3, bibl. 1 in text.

This is a review of an article by Hofstede and Ardiwinata in *Landbouw* 1950, 12, pp. 469-94, in which the authors describe various methods of fish culture in irrigated rice fields and demonstrate the benefit derived by the rice crop.—A.G.G.H.

96 HUNTER, I. R., and others. **Development of free fatty acids during storage of brown (husked) rice.** *Cereal Chem.* 1951, **28**, 232-9, bibl. 32. [Agric. and Industr. Chem. Bur., US Dept Agric., Albany, Calif.]

Commercially dehulled samples of Caloro brown rice with moisture contents of 3.9, 6.6, 9.5, 11.8 and 14.1% were stored for 22 weeks at temperatures of 32, 35.5, 77 and 95°F. The free fatty acid content of the samples with moisture contents of 14.1 and 6.6%, stored at temperatures of 32 and 77°F., respectively, increased by approximately 1% per month of storage. At storage temperatures of 25°C., the rate of free fatty acid formation in grain with a moisture content of 14.1 was 4 and 16 times greater than that containing 9.5 and 3.8% moisture, respectively.—From authors' summary.

OTHER

97 MIMEUR, Geneviève. Systématique spécifique du genre *Coix* et systématique variétale de *Coix lachryma-jobi*. Morphologie de cette petite céréale et étude de sa plantule. [**Systematics of the species of the genus *Coix* and the systematics of the varieties of *Coix lachryma-jobi*. Morphology of this small cereal and study of its seedlings.**] *Rev. Bot. appl.* 1951, **31**, 197-211, bibl. 16, illus.

This botanical study of the genus *Coix* was carried out on the collection at the museum of Natural History in Paris. A key is given for the determination of the *Coix* species. The species described are: *C. gigantea*, *C. poilanei* nov. sp., *C. ouwehandii*, and *C. lachryma-jobi*. Several varieties, mostly of *C. lachryma-jobi*, are also described. Among these are the new varieties *major* and *minor* of *C. lachryma-jobi*.—E.B.

98 COVAS, G. Nuevo *Hordeum* hexaploide indígena en la Patagonia. [**New hexaploid *Hordeum* indigenous to Patagonia.**] *Rev. Argent. Agron.* 1951, **18**, 74-7, bibl. 1, illus.

A botanical description is given of *Hordeum* *parodii*, a new hexaploid species. Its habitat is restricted to the centre and northwest of Patagonia.—N.G.S.

99 FORLANI, R. Casi di partenocarpia in *Hordeum*. [**Cases of parthenocarpy in *Hordeum*.**] *Genet. agr.* 1950, **2**, 193-8, bibl. 6, English summary p. 198.

100 VARENICA, E. T. [**Characteristics of some varieties of *Setaria viridis*.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 6, 38-41. [Zonal Inst. Grain Husbandry, Non-black Soil Region, USSR]

In 1950, experimental sowings were made in many parts of the Soviet Union of different varieties of *S. viridis* [known in USA as green bristlegrass] received from China. The author gives an account of the botanical and/or agronomical characteristics of 21 Chinese varieties which may be encountered in sowings of various provinces in USSR.—M.H.

GENERAL

101 SEKUN, P. F. [**Intra- and inter-species relationships in cereals.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 3, 23-33, bibl. in text.

Results of experiments conducted at the Moscow State Selection Station during 1946/1949 are reported. When a mixture of rye and wheat was sown, the latter was sharply suppressed by the rye. When a mixture of hard and soft wheat was sown, the hard wheat was suppressed by the soft. Hard wheat is poorly adapted to the mellow soils of the Moscow province and does not produce stable yields there.—R.P.J.

102 PFEIFFER, R. Ergebnisse der Admonter Getreidesortenversuche für das österreichische Zuchtbuch im Anbaujahr 1949/50. [**Results of the Admont cereal varietal trials for the Austrian pedigree book in the cultivation year 1949/50.**] *VersuchsErgebn. Bundesanst. alp. Landw. Admont* 1951, No. 9, 22, bibl. 6. [Bundesanstalt für alpine Landwirtschaft, Admont, Austria]

The performance of Austrian bred varieties of winter cereals (barley, rye and wheat) and summer cereals (wheat, barley and oats) is tabulated On account of the extremely dry summer of 1950 in Austria, results showed wide deviations from those obtained in former years and could be compared with results of former years only as regards yield. However, the suitability of the climate of Admont for testing such qualities as winterhardiness, rigidity and resistance to diseases and pests was again confirmed.—D.B.

103 TRAAEN, E. Kornavsoppingsforsøk med kjemikalier i årene 1944-49. [**Experiments regarding treatments of seed grown with disinfectants during the years 1944-49.**] *Forsk. og Forskning* 1950, **1**, 421-46, bibl. 6, English summary pp. 445-6. [Mikrobiol. Inst., Norges Landbrukshøgskole, Aas]

Tests were carried out with 32 dust and 3 oil seed-treatment compounds to determine their effectiveness against bunt of wheat (*Tilletia caries*), covered smut of barley (*Ustilago jensenii*), oat smuts (*U. avenae* and *U. kolleri*) and barley stripe (*Helminthosporium gramineum*). Tabulated data are given of the rate of treatment for each fungicide, the germination percentage of wheat, oats and barley and the percentage of diseased plants following seed treatment. The treatments which gave complete control of all the diseases were: Panogen, Täyssato (a methoxyethylmercuric chloride compound; one year's test only) and Ceresan N.I. (Granosan). Next in order of effectiveness were: Aagrano 175 (1 year's test), Røboles dust (a mercuric dust; one year's test), Germisan Universaltrockenbeize, Betoxin 61, Betoxin F (the last two with only variable effectiveness against bunt), Bayer Ceresan, Certosan, Belgian Ceresan, Prochim C.R. 301 (one year's test), Semenon (ineffective in the 1949 tests), Abavit 3% Schering (Berlin), the British Schering compounds Abavit BP15, Abavit B10A and Abavit A 1047, Lunasan and Lunasan P.M.C. (the last 5 were tested during 1 year only). All these compounds in the second group were effective in the case of lightly, but not heavily, infected seed. Of compounds which were ineffective as seed treatments against all 5 pathogens, but in some cases were effective against one, or more, of them, were: Carbide and Carbon Chem. Corp. L.224, Agrosan G, Sanagran, Weizenbeize, German Schering, Geigy Graminon, Maag P619 (German), Leytosan, Abavit BC 30, Abavit B1047, Abavit B 1% (all 3 British products), P.K. 101, P.K. 102 (Norwegian products) and the Maag (German) products Prosat, Prosat W 406 and non-toxic Prosat. Maag Prosat, Graminon and Weizenbeize were very effective against bunt, while P.K. 101 and P.K. 102 were very effective against oat smut. The influence of environmental factors in the soil on the effectiveness of seed treatment is discussed. Where the soil was either very moist or very dry, the effectiveness of seed treatment was reduced.—P.J.B.

104 OXLEY, T. A. **The storage and drying of cereal seeds.** *J. nat. Inst. agric. Bot.* 1951, **5**, 461-82.

The standards required for seed storage are higher than those required for ordinary cereal storage. Poor storage conditions will be followed by a decline in germinative energy and a gradual increase in the number of seeds which germinate very weakly, or not at all, and are attacked by fungi during the germination test. Increase in fat acidity, associated with spontaneous heating, is probably due to mould development. It is therefore probably a measure of fungal activity, which may in turn be related to the performance of the seed in germination tests or in the soil, or of barley in malting. The principles of grain preservation are stated and the kinds and uses of insecticidal measures and methods of drying seed grain are described.—C.L.S.

105 MALIANI, C. Relazione su l'attività svolta dalla Stazione Fitotecnica di Badia Polesine nel primo decennio (1937-1947). [**Report on the work of the Phytotechnic Station of Badia Polesine (Rovigo, Italy) in the first ten years (1937—1947) of its activity.**] *Genet. agr.* 1948, **2**, 107-47, English summary p. 147. [Received 1951]

The Phytotechnic Station of Badia Polesine comes under the National Institute of Genetics for Cereal Cultivation, Rome. A brief account is given of the experimental work on wheat, barley, oats, maize and other crops. The work and organization for producing and multiplying the stock seed of the wheat varieties bred by the Institute of Genetics for cultivation in northern Italy is described at length.—E.B.

106 MACHACEK, J. E., and others. **A study of some seedborne diseases of cereals in Canada. II. Kinds of fungi and prevalence of disease in cereal seed.** *Sci. Agric.* 1951, **31**, 193-206, bibl. 4.

During the period 1939-45, 8428 samples of wheat, barley and oat seed from eight seed inspection districts of Canada were examined for vigour and the presence of disease. A plating test for fungi was carried out on 6204 of the samples, and 43 genera and 102 species, many of them saprophytic, were detected. Notes are given on the prevalence of each genus. Oat and barley seed showed a larger and more varied flora than wheat seed. *Alternaria* (saprophytic) was the commonest genus, but *Helminthosporium* was the commonest of the pathogens. Health and vigour were determined in non-sterile soil tests and smut spore-loads by centrifuge tests. Seed from eastern Canada was more frequently infected with pathogenic fungi than seed from western Canada, but mechanical and frost injury was commoner in the west Canadian samples. Defective samples were more common in commercial grade seed than in the higher grades.—C.W.S.H.

107 EGGINK, H. J., and RIEPMA, P. Voorlopige mededeling over de invloed van chemische onkruidbestrijdingsmiddelen op de opbrengst van een graangewas. [**Preliminary communication on the effect of chemical weedkillers on the yield of cereals.**] *Maandbl. LandbVoorlDnst* 1951, **8**, 101-3 [Cent. Inst. Agric. Res., Wageningen, Netherlands]

Autumn-sown rye and wheat were periodically sprayed with DNC and 2,4-D during the 1949-50 growing season. The results are described and illustrated by diagrams. Conclusions drawn are that a cereal, when tillering, is very sensitive to spraying with 2,4-D and that a suitable time to spray is after the sixth leaf has been formed. On the other hand, DNC applied to a tillering plant produces increased yield, and the best time to use this spray is from the development of the fourth to the fifth leaf. In rye, increases in yield of approximately 300 kg. per ha. can be obtained from the use of DNC.—G.M.R.

108 AUFSESS, A. Ein Beitrag zur Schwarzrostforschung in Österreich. [**A contribution to research on black rust in Austria.**] *Bodenkultur* 1950, **4**, 186-203, bibl. 26.

The paper is largely concerned with the life history of the black rust fungus, *Puccinia graminis*, which is found on a variety of grasses and cereals. Control measures include the earliest possible sowing of early ripening varieties of cereals and the harvesting of the crop 2 or 3 days before it is fully ripe. The breeding of resistant wheat varieties has been successful, but the problem is more difficult with oats. The most important control measure in Austria is the destruction of barberry. Laws for enforcing its destruction exist in several of the Austrian States. How far infected pastures and meadows contribute to infection of cereals is an open question. *Agropyron repens*, if in the vicinity of barberry, acts as an intermediate host of the disease on rye.—D.B.

109 BALDACCI, E., and FORLANI, R. Ricerche su varie razze di cereali, spontanei e coltivati, in relazione ad attacchi di *Claviceps purpurea*. [**Research on several cereal varieties, wild and cultivated, in relation to attacks by *Claviceps purpurea*.**] *Genet. agr.* 1948, **2**, 73-84, bibl. 15, English summary p. 84. [Received 1951]

Several cereal species were inoculated artificially with Ergot, *Claviceps purpurea*, by placing a drop of a culture solution of this fungus on the stigma. The following species developed the infection with different degrees of intensity: *Secale cereale*, *Triticum sativum* var. Gentile 48, Est, Mentana and Damiano, *T. durum*, *T. turgidum*, *Hordeum vulgare*, *Lolium italicum*, *L. perenne*, *L. temulentum* and *Agropyrum* sp. The following species were not infected: *Triticum sativum* var. S. Giorgio, 220 and Novaro, *T. dicoccum*, *T. monococcum*, *Aegilops* *ovata*, *Avena sativa*, *A. fatua* and *Bromus* sp. In *T. sativum*, the late and medium varieties were generally susceptible, while the early varieties were immune. The infection had a different intensity according to the stage of anthesis at which inoculation was made. When emasculated spikes of *T. sativum* var. Gentile 48, Est and Mentana were inoculated, the infection was more serious than when complete spikes were inoculated. Inoculations of naturally sterile hybrids (male and female sterility) of *Triticum* × *Aegilops* and *Triticum* × *Agropyrum* were unsuccessful. It is supposed that in these cases there was a deficiency of the growth substances which determine sterility so that the development of *Claviceps* was prevented. [See also *Fld Crop Abstr.* 2 : 186]—E.B.

110 HORBER, E. Untersuchungen über die gelbe Getreidehalmfliege *Chlorops* (*Oscinis*) *pumilionis Bjerkander 1778* und ihr Auftreten in verschiedenen Höhenlagen der Schweiz. [**Investigations into the yellow cereal stalk-fly and its occurrence in various elevated localities in Switzerland.**] *Landw. Jb. Schw.* 1950, **64**, 889-1000, bibl. 217. [Gachnang, Thurgau, Switzerland]

The greater part of the paper is concerned with the biology and systematics of this insect (*Chlorops pumilionis*), but some information is given on control measures. The Huron variety of summer wheat is the least liable to attack. It has been found that manuring of poor soils has resulted in a more feeble attack by the fly ; the soil of newly-cultivated land therefore should first be analysed and the land manured according to its needs. Removal of *Agropyron repens* is an essential measure. Those cultural methods which delay growth, e.g. rolling, harrowing, scarifying, thinning and the use of chemical herbicides, should be abandoned or used with caution. Of chemical insecticides, DDT and Hexa preparations failed to reduce the attack, but spraying twice with a Parathion suspension (4 g. active substance per are) and dinitro cresol preparations (39.9 g. active substance per are) reduced the attack.—D.B.

111 KULEŠOV, N., and LAPCEVIČ, G. [**Concerning the time of cessation of stem growth in cereals.**] [Russian] *Doklady Akad Nauk SSSR* 1951, **76**, 289-92, bibl. 15.

Results of investigations with spring wheat, oats, barley, millet, maize, sorghum and Sudan grass are reported. Comparison of the daily increments of stem growth showed that the increments during the days immediately preceding flowering and during the early days of flowering were considerably greater than the increments during the subsequent days. Growth in stem height of the maize variety Minnesota 23 during the first half of the flowering period was 20.6 cm., and during the second half 2.9 cm. For Sudan grass the corresponding figures were 31.5 cm. and 8.6 cm. With the completion of flowering, stem growth ceased.—R.P.J.

112 COÏC, Y., and others. Fertilisation par le sulfate de manganèse. [**Fertilization with manganese sulphate.**] *Ann. Inst. nat. Rech. agron.* Ser. A, 1950, **1**, 607-13.

In order to remedy a manganese deficiency in the soils of Brittany, caused by excessive liming, manganese sulphate (the manganous salt) was applied in three ways : (1) well mixed with other fertilizers, (2) as a solution sprayed on to the crop, (3) applied alone as a top dressing.

(1) In a field experiment on oats (var. Ligowo), manganese sulphate was applied mixed with other fertilizers (potassium chloride and calcium superphosphate), the manganese sulphate being applied at the rate of 50 kg. per ha. The yield of grain and of straw was almost doubled, the ratio of grain to straw was clearly increased and the manganese content of the crop was slightly increased. The application of 30 kg. nitrogen per ha. (as calcium nitrate) after the appearance of manganese-deficiency symptoms in the crop resulted in increased yields whether manganese sulphate had been added or not. The nitrate acted not only as a fertilizer itself, but it made the manganese which was already present in the soil more available to the plant. In pot experiments, plants of the Ligowo variety of oats having deficiency symptoms showed a growth of new tillers which developed late and in which deficiency symptoms were less serious. This phenomenon has often been observed in field experiments with wheat and oats and has been accounted for by the growth of the roots into the sub-soil. This explanation does not hold for pot experiments. The author attributes the renewed growth of the plant to a greater capacity of absorption by the roots, at a given stage. A black variety of oat, grown on a soil which was not deficient yet not rich in assimilable manganese, was treated with 50, 100 and 300 kg. manganese sulphate per ha. The manganese content of grain and of straw, which was high in this variety, increased with increasing applications of the manganese salt, the range of variation being greater in the straw than in the grain.

(2) Spraying at the rate of 50 to 100 kg. manganese sulphate per ha. on cereals showing deficiency symptoms resulted in the leaves becoming green again and a recovery in the yield of grain and straw. In the course of recovery of the wheat plant there is a critical period (early April to early June) during which it can absorb only a small amount of manganese from the soil though, as a result of increased growth, its needs are greater. It is possible that a better recovery would be

attained by giving the total amount of manganese sulphate at intervals over a period rather than in one application.

(3) Manganese sulphate applied in powder form as a top dressing had a less rapid effect on oats and wheat than when the manganese salt was sprayed.—D.B.

113 Paauw, F. van der. Hectolitergewicht, duizend-korrelgewicht en korrel-percentage in afhankelijkheid van de bemestingstoestand. [**Thousand-grain-weight, weight per hectolitre and ratio of grain yield to total yield of cereals as affected by soil fertility level.**] *Landbouwk. Tijdschr.* 1951, **63**, 116-24, bibl. 3, English summary p. 124. [T.N.O. Agric. Expt Sta. and Soil Res. Inst., Groningen, Netherlands]

Thousand-grain-weight and weight per hectolitre depend on the lime and potash level of the soil. Except in extreme cases, no very significant effect is exercised by phosphate and nitrogen, and the effect of nitrogen is rather variable. Differences between cereal plots receiving varying amounts of lime and potash are frequently as clearly seen in thousand-grain-weight and weight per hectolitre figures as in yield. Increasing amounts of potash may continue to raise these values even after the grain yield has reached its maximum, except in the case of oats. Increased dressings of lime do not produce the same result. Statistical investigations on the relation between lime or potash level and the reaction of the crop appear to be possible without making use of crop yields. A clear correlation is found between thousand-grain-weight and weight per hectolitre; it is, however, variable in different cases. Contrary to the results obtained from wheat, rye and barley, those obtained from oats were very variable. The ratio of grain yield to total yield (grain plus straw) is generally a less accurate measure. In some cases, however, the correlation of the pH of the soil with this ratio was clearer than the correlation with grain yield or straw yield separately, a fact of possible value in studying liming experiments.—From author's summary.

114 England and Wales, Ministry of Agriculture and Fisheries. Leafl. No. 9. **Fixed equipment of the farm. Construction of farm grain silos.** 1951, pp. 15.

Advice is given with regard to the size, number type and construction of farm grain-silos.—From author's extract.

115 Germek, E. Emprẽgo de Gammexane no contrõle de insetos prejudiciais aos cereais armazenados. [**Use of Gammexane in the control of prejudicial insects in stored cereals.**] *Braganita* 1950, **10**, 123-4, bibl. 2, pl. 1, English summary p. 124. [Inst. Agron. Campinas, Esta. São Paulo, Brazil]

Insect pests in wheat (but not in the maize varieties Catete and Armour) were controlled by a mixture of 4 parts Gammexane dust D.034 to six parts of talc applied at a rate of 0.1% by weight.—N.G.S.

LEGUMES

COWPEA

116 Oklahoma Agricultural Experiment Station. Bull. No. B-371. **Cowpeas for Oklahoma.** By *L. L. Ligon.* 1951, pp. 15.

Summarized results are given of trials at 4 locations in Oklahoma during 1924 to 1948 with a large number of varieties of field and edible cowpeas (*Vigna sinensis*). Among field varieties, Early Red gave the best seed-yield averages with 9.69 bu. per ac., followed by New Eva, 9.62, Buff, 9.28, and Victor K-798, 9.16 bu. Among edible varieties, Dixie Queen Purple Pod headed the yield averages with 8.41 bu. per ac., followed by Arlington, 8.39, and Brown Crowder 7.83 bu. Descriptive notes are given of a number of varieties and a tabulated list gives a tentative classification of cowpea varieties according to their resistance to bacterial canker and bacterial blight.—P.J.B.

SOYABEAN

117 Ouellette, G. J. **Iron-manganese interrelationships in plant nutrition.** *Sci. Agric.* 1951, **31**, 277-85, bibl. 16. [Ste. Anne de la Pocatière Domn Exptl Sta., Quebec]

Solution culture tests were carried out with soyabean plants to study the effect of different concentrations and ratios of Fe and Mn in the substrate on the growth of the plants and the development of symptoms of deficiency or toxicity in them. Mn substrate concentrations used were 0.01, 0.1, 1, 2.5, 5, 7.5, 10 and 12.5 ppm, each in combination with 5 and 15 ppm Fe. The Fe concentrations were 2.5, 5, 10, 15, 20 and 25 ppm, each in combination with 0.1 and 1 ppm Mn. Increasing the Mn concentration from 0.01 to 1 ppm greatly increased plant growth in the presence of both concentrations of Fe; no Mn toxicity symptoms were observed with less than 2.5 ppm Mn in the presence of 5 ppm Fe and with less than 5 ppm Mn in the presence of 15 ppm Fe in the substrate. Plants growing in solutions containing 0.1 ppm Mn and 15 ppm Fe showed Mn deficiency symptoms. Increasing the Fe concentration in the substrate from 2.5 to 20 ppm greatly increased plant growth. At Fe concentrations of 25 and 30 ppm, plant growth did not increase above that produced by 20 ppm Fe. Slight Fe deficiency was noted in plants growing in substrates containing 2.5 ppm Fe and 1 ppm Mn, while those growing in substrates with 2.5 ppm Fe and 0.1 ppm Mn were normal. Where the Fe-Mn ratio was greater than 150:1, Mn deficiency, but not Fe toxicity, resulted. Where the Fe-Mn ratio was 2.5 : 1, Fe deficiency, but not Mn toxicity, occurred. Where the Fe-Mn ratio in the substrate was maintained at 30 : 1, using different concentrations of the two elements, no Fe deficiency or Mn toxicity resulted. Normal growth did not take place in substrates containing an Fe-Mn ratio of 2 : 1 where different concentrations of Fe and Mn were used. Plant weights varied from 4.9 g. on substrates containing 0.3 ppm Fe and 0.01 ppm Mn, to 35.3 g. on substrates containing 15 ppm Fe and 0.5 ppm. Mn, a fact indicating that the concentration of Fe and Mn in the substrates had an effect on plant growth over and above the effect of the ratio of these elements. The plants grew normally in substrates in which the Fe-Mn ratio ranged from 5 : 1 to 100 : 1 where the Mn concentration in the substrate was more than 0.1 and below 2.5 ppm and the Fe concentration more than 2.5 ppm. To obtain maximum plant growth, however, the Fe-Mn ratio had to be kept within narrower limits than those quoted above. These findings were applicable to the entire growth period of the plants.—P.J.B.

118 LATHWELL, D. J., and EVANS, C. F. **Nitrogen uptake from solution by soybeans at successive stages of growth.** *Agron. J.* 1951, **43**, 264-70, bibl. 21. [Ohio Agric. Expt Sta., Wooster]

Two series of studies were made of the total N requirements of soyabean plants grown from uninoculated seed in sand cultures to which 20, 100 and 300 ppm N were added at different times. The results indicated that a level of at least 100 ppm of N in the culture solution during the period from flowering to maturity was necessary for maximum growth, while plants grown in solutions containing 300 ppm N up to the mid-flowering stage, did not accumulate sufficient N for their subsequent growth, where N was withdrawn from the nutrient solution after this stage. It was noted that the number of flowers produced by the plants was approximately the same, regardless of N treatments, but those receiving 300 ppm during the flowering stage retained a significantly higher number of pods than those receiving 20 ppm N during this period. The different N treatments did not appear to affect the relative numbers of pods containing 1, 2 and 3 beans. Determinations of the N accumulation in the plants indicated that there was a great demand for N during the development of pods and beans and no indication of the cessation of N absorption until the plants were mature. Plants were able to utilize N more effectively in the early than the late stages of growth. It was noted that the ratio of the water soluble N to the total N content of the plants tended to remain constant at any given time or under any given content of N in the substrate. The carbohydrate : N ratio increased with the age of the plants, but there did not appear to be any relationship between any given carbohydrate : N ratio and the initiation of fruit.—P.J.B.

119 ŠČERBAKOV, A. P. [**The role of calcium in the accumulation and distribution of dry matter in the different organs of soyabean.**] [Russian] *Doklady Akad. Nauk SSSR.* 1950, **74**, 851-4, bibl. 6.

The investigation showed that when the plants were provided with an adequate amount, or when they received an abundance, of calcium in the nutrient medium, the weight ratios between leaf-mass and stems altered in favour of the stems, while the absence or a deficiency of calcium and an absolute or relative abundance of magnesium altered the ratio in favour of the leaves. A similar phenomenon was observed also in the ratio between the above-ground organs and the roots. Calcium contributed to the formation of the roots to a greater extent than magnesium. An increase in the concentration of calcium in the nutrient medium was accompanied by a narrowing of the ratio of dry-weight of the valves of the pods to the weight of the seeds, while magnesium had the opposite effect.—R.P.J.

GROUNDNUT

120 MICHAUX, P. L'économie de l'eau dans les cultures tropicales d'oléagineux. [**Water economy in tropical oil crops.**] *Oléagineux* 1951, **6**, 449-57.

General advice is given on the management of groundnut crops, particularly with regard to the water economy.—E.B.

121 WESSELS, J. G. H. **Groundnut cultivation in the Western Transvaal.** *Fmg S. Afr.* 1951, **26**, 191-3.

122 INDIAN FARMING. **Improved varieties of oilseeds** [**groundnuts**]. *Indian Fmg* 1951, **1**, No. 5, 26-8.

A table of 17 improved strains of groundnuts sets out for each variety the time of sowing and harvesting, the duration of the crop in days, the colour of the seed, the average yield per acre [unit of yield not stated], the percentage of oil content, any special features, and the source from which seed may be obtained.—N.G.S.

23 Gopala Iyengar, K., and Sreenivasa Iyengar, G. **Vigour in groundnuts.** *Curr. Sci.* 1951, **20**, 186. [Bot. Sect., Dept Agric., Bangalore]

Two groundnut hybrids, H.G.5, a cross between Iysore Local and Spanish, and H.G.6, a cross etween Virginia and Small Japan, gave 2-3 times he normal haulm yield. Both hybrids are branchng in habit, hardy, resistant to drought and olerant to *Cercospora* leaf spot. Their yield of ods compares favourably with commercial types; he pods are two-seeded, and are often deeply onstricted and slightly misshapen.—N.G.S.

24 Smith, B. W. ***Arachis hypogaea*. Aerial flower and subterranean fruit.** *Amer. J. Bot.* 1950, **37**, 802-15, bibl. 87. [N. Carolina State Coll., Raleigh]

The long botanical history of *Arachis hypogaea* has een filled with error and controversy regarding he reproductive structures of this plant. The rrors have continued to appear in recent botanical iterature. The two kinds of floral dimorphism, vhich have been described for *Arachis* do not xist. The flower exhibits an extreme type of erigyny with the stalk-like, tubular hypanthium, ttaining a length of two inches. All of the lowers are alike in structure, papilionaceous, and otentially fertile. The flower is sessile. Conequently the "flower stalk" or "pedicel" cannot longate. The androecium consists of eight anthereearing stamens and two sterile filaments. The tamens are monadelphous, not diadelphous. The our elongate anthers are adnate, introrse, not asifixed as repeatedly described. The gynoecium onsists of a monocarpellate, sessile ovary, and a nuch elongated, filiform style with a minute, clubhaped stigma. The ovary develops into a stalkike structure called the peg, which bears the vules in its tip, grows geotropically, and penerates the soil. The peg grows by elongation of he ovary base and, in some forms, from elongaion of the constricted ovary between the seedearing segments of the pod. The peg tip enrges to form the underground pod, which is a otentially dehiscent but functionally indehiscent gume. Pod development usually occurs underround.—From author's summary.

25 Yarborough, J. A. ***Arachis hypogaea*. Seedling growth rate.** *Amer. J. Bot.* 1950, **37**, 779-85, bibl. 17. [N. Carolina State Coll., Raleigh]

'his record of certain quantitative aspects of the arly seedling growth of *A. hypogaea* extends the arlier report describing gross morphological eatures [*Fld Crop Abstr.* 3: 1409]. In view of he widespread observations of an early growth g in the peanut seedling about the time when the ood from the cotyledons is being exhausted, a further purpose of this study was to determine whether this lag is an inherent one or is caused by external factors. "Virginia bunch peanut seedlings, germinated and grown under favourable conditions, showed no growth lag up to the appearance of flowers. Appearance of expanded leaves, stem length, root length and dry weights of roots and shoots, shown as functions of age, describe curves which represent a period of rapid and relatively uniform growth. These curves show only an early fraction of the entire growth process of the shoot of the plant. Root elongation proceeds very rapidly, gaining decidedly over the hypocotyl in the early days of germination. Secondary roots do not appear before the fifth day, but within 10 days are numerous and in that time may reach 166 mm. in length. The hypocotyl undergoes a loss in dry weight parallelling in time a similar loss in the cotyledons. The hypocotyl later makes gains in dry weight as its secondary growth is initiated. Relatively low temperatures, even for a few days, may produce a slight lag in growth of the shoot. Thrips attacking plants during the pre-flowering period may also retard shoot growth. Young seedling leaves may be seriously injured by insects. Applied repeatedly, 5% DDT dust gave excellent control."—D.B.

126 Bolhuis, G. G. Natuurlijke bastaardering bij de aardnoot (*Arachis hypogaea*). [**Natural hybridization in groundnut.**] *Landbouwk. Tijdschr.* 1951, **63**, 447-55, bibl. 11, English summary pp. 454-5. [Lab. voor Trop. Landbouwplant., LandbHoogesch., Wageningen]

Studies were made of natural hybridization between groundnut varieties with red, rose and white seed coats, grown in adjacent rows and adjacent plots, during the east and west monsoons of 1939 and 1940 at Buitenzorg, Indonesia. The results indicated that wide variations existed between varieties in the proportion of their plants which produced hybrid seed. Up to 6% of the plants of a white-seeded variety were cross-pollinated, while almost none of the plants of Schwartz 21, a rose-seeded variety, were cross-pollinated. Plant distances of 2 m. were not sufficient to prevent the white-seeded variety from being cross-pollinated, while in the case of Schwartz 21, a distance of 2 m. from other varieties was sufficient to prevent cross-pollination. Since it is a generally accepted fact that the pollination of groundnut flowers takes place under tropical conditions between 2 and 4 a.m., it is thought that natural hybridization is the result of (a) a more rapid growth of the pollen tubes of foreign pollen than that of the plant's own pollen; or (b) the excretion by the plant of substances which are relatively more harmful to the growth of the tubes of its own pollen, or (c) a combination of both

(a) and (b). The relatively low prevalence of natural hybridization in plants during the west monsoon as compared to the east monsoon is considered to be probably due to the relatively late opening of flowers on account of the prevalence of clouds. Under these conditions, the pollen tubes, in the case of self-pollination, are able to obtain a start in growth sufficient to prevent their being overtaken by the tubes of foreign pollen.—P.J.B.

127 PREVOT, P., and OLLAGNIER, M. Application du diagnostic foliaire à l'arachide. Premiers résultats au Sénégal. [**Application of foliar diagnosis to groundnuts. First results in Senegal.**] *Oléagineux* 1951, **6**, 329-37, bibl. 22.

In two trials of chemical manuring of groundnuts, carried out in the Thiès and Sefa regions, respectively, the effect on yield of the 27 manurial treatments tested was related to the percentages of the chemical elements in the leaves. From the chemical analysis of the basal leaf of the principal stem at the beginning of flowering, it appeared possible to determine the limiting factors in mineral nutrition and, therefore, the manuring formulas suitable for different localities. This study revealed that there are interactions among the elements N, P, K, Ca and Mg, the negative interaction between P and K being the most important. Tables and graphs show the results in detail.—E.B.

128 DAVIS, F. L. **Nutritional problems of peanuts in south-eastern Alabama.** *Better Crops with Plant Food* 1951, **35**, 6-10, 45-8, illus.

The results of 18 experiments in 1949 and 26 in 1950 showed the responses of groundnuts to lime and gypsum on soils with low exchangeable calcium content. Low shelling-percentages obtained on these soils were increased by applications of lime or gypsum and it was concluded that both the exchangeable calcium content and the shelling percentage indicate the calcium needs of a soil. On some soils, potash manuring was required before responses to calcium could be obtained, and the addition of potash without calcium decreased quality and yield. In an overlimed area almost complete recovery was obtained by applying potash and zinc sulphate.—C.W.S.H.

129 BORIUS, H. Les rendements de l'arachide au Sénégal. [**Groundnut yields in Senegal.**] *Oléagineux* 1951, **6**, 389-94.

Although statistical data for groundnut cultivation in Senegal are not accurate, it appears that the average yearly production of 4 normal post-war years has decreased by about 20% compared with the production of 4 normal pre-war years. As the area under groundnuts has not varied considerably, this decrease in production is due to a fall in yield per unit area, thought to be caused mainly by loss in soil fertility. In 1950, a year of exceptionally adverse climatic conditions, the total production of unshelled groundnuts was 330,000 metric tons from an area of 646,000 ha., or about 500 kg. per ha. The average yield per ha. for 1945-49 was 625 kg. Disinfection of seed and manuring of farms, which should be encouraged, are briefly described. The groundnut variety 28.206, selected by the Bambey Expt Sta., performed well in Casamance, High Volta and Morocco. It yielded 2000 kg./ha. under irrigation in Morocco.—E.B.

PEA

130 PALETTA, K. Der Erbsenwickler (*Grapholita* spec.). [**The pea leaf-roller moth (*Grapholita* spp.).**] *Dtsch. Landw.* 1950, **1**, 215. [Wanzleben-Börde, Germany]

The following facts are of interest when considering the control of the pea moth (*Grapholita nebritana*, *G. nigricana*, and *G. dorsana*). The flying period begins about end of May and lasts for about 6 weeks. The moth avoids wind and flies only during calm weather and at sunset. It can fly up to 500 m. All stages of the insect are resistant to cold weather. There are no known varieties of pea which are resistant to the moth, but some loss could be avoided by sowing early varieties. At present, the only possibility of control is to attack the larva when in the soil. Suggestions are offered for future lines of investigation for control at this stage. They are cultivation of the land, chemical control and baiting.—D.B.

BEAN

131 TAFURO, A. J., and VANGELUWE, J. **Further results with pre-emergence weed control in field beans.** *Proc. 5th North-eastern Weed Control Conf.* 1951, 187-91. [Co-op. G.L.F. Exchange, Inc., Ithaca, N.Y.]

In trials at Delaware University and at two locations in New York State, applications of 6 dinitro-type herbicides, one aromatic oil and different aromatic oils combined with dinitro compounds, were made to beans 6 days after sowing. In all trials, the dinitro compounds gave the best weed control. Premerge and Sinox PE gave good residual control for at least 4 weeks after treatment, when applied at a rate of 1 gal. per ac. (3 lb. of herbicide). They were equally effective on light sandy and heavy loam soils and caused no damage to the beans. Agrinol A and other aromatic oils alone, or in combination with dinitro ompounds, gave good initial weed control, but ost their residual effect within 10 to 14 days.—.J.B.

32 Braconi, L. Vinta l'orobanca? [**Is *Orobanche* controllable?**] *G. Agric. Domen.* 1951, **61**, 264.

The cultural method described for controlling Orobanche in *Vicia faba* crops consists in sowing he beans in furrows 20 to 22 cm. deep, the urrows being left open and the beans covered with very little earth. As the bean plants grow, the urrows gradually fill up through cultivation, etc. Although this method of sowing causes a certain amount of failure during sprouting, in the trial described it reduced the infestation by *Orobanche* considerably. [See also *Fld Crop Abstr.* 4 : 415] —E.B.

33 Gaitonde, M. K., and Kamala Schonie. **Trypsin inhibitor in field bean (*Dolichos lablab*).** *Curr. Sci.* 1951, **20**, 217-18, bibl. 4. [Dept Biochem., Inst. Sci., Bombay, India]

t was found that *Dolichos lablab* contains a trypsin nhibitor, the concentration of which does not ncrease on germination. This trypsin inhibitor does not affect peptic activity, nor does pepsin destroy it.—N.G.S.

34 Wynd, F. L., and Stromme, E. R. **Absorption of manganese and iron by Navy bean plants grown in a calcareous soil fertilized with a manganese-containing glassy frit.** *Lloydia* 1951, **14**, 40-54, bibl. 15. [Bot. and Plant Pathol. Dept, Michigan State Coll. East Lansing]

Studies were made of the availability to bean plants of Fe and Mn contained in a very insoluble lassy frit added to Mn-deficient calcareous soil. 0 lb. of the finely-ground frit were added to the top in. of soil over an area 10 ft. square. The addition of the frit to the soil increased the dry-weight f the bean plants and their seed yield by approximately 100% and 43%, respectively, compared with untreated controls. The addition of 200 lb. f manganese sulphate per ac. resulted in better lant growth than did the addition of the frit, wing to the poor balance of Fe and Mn made vailable to the plants by the frit. The frits aused symptoms of Fe deficiency, or else Mn oxicity, in the bean plants. The need is stressed or relating the ratios of Fe and Mn made available y frits to the requirements of the plants and the otal amounts of Fe and Mn available in the soil.—.J.B.

UPIN

35 Lamberts, H. Veredeling van voederlupine voor voedingsdoeleinden. [**The breeding of sweet lupin for human nutrition.**] *Voeding* 1950, **11**, 217-26, English summary pp. 225-6.

In 1948 work was begun at the Plant Breeding Station, Wageningen, on the selection of alkaloid-free yellow lupin with the object of providing a new source of human food. A number of genetically alkaloid-free plants has been isolated. The protein content of the seed is about 44%, with a high biological value and a lecithin content of about 2.13%. So far, seed regulations in the Netherlands do not permit the use of lupin seed for human consumption, but it is thought that by adopting the rapid qualitative method of alkaloid determination outlined in this paper, and the growing of lupin crops in isolation, this difficulty may be overcome.—P.J.B.

ROOTS

SUGAR-BEET

136 Archimowitsch, A. von. El cultivo de remolacha azucarera para la obtención de semillas. [**The cultivation of sugar-beet for seed production.**] *Bol. Inst. Invest. agron.* 1951, **11**, 79-133, bibl. 55, English and German summaries pp. 129-30. [Prod. de Semillas S.A., Valladolid, Spain]

Although sugar-beet cultivation is relatively new to Spain, that country produces all the seed it requires. Spain, however, is obliged to import seed of sugar-beet varieties from foreign countries for multiplication since suitable varieties are not yet bred locally. The first part of this article deals with the biology of sugar-beet and describes its development cycle, flowering and the structure of the seed cluster. The second part describes the methods used for seed production in foreign countries, while the third part gives an account of trials on the growing of sugar-beet for seed carried out from 1948 to 1950 in Castile. The main conclusions from these trials were as follows: (a) the most economical way of producing sugar-beet seed in this region is to sow in nurseries from early August to early September, or even early in autumn, after the harvest of the principal crop; the plants can remain in the field during winter, free from frost, and in spring are thinned to the appropriate stand, the thinning being used for transplanting to other plots; (b) where irrigation water is not available, it is necessary to sow the nurseries in spring and to transplant in the following spring; (c) in northern Castile, where rainfall is higher, sugar-beet for seed can be grown successfully without irrigation; (d) both the plants sown in spring and those sown at the beginning of August can be transplanted in the following autumn, a practice which gives better results than transplanting in spring.—E.B.

137 Donà dalle Rose, A. Aspetti della bieticoltura meridionale. [**Aspects of sugar-beet cultivation in southern Italy.**] *Humus, Milan* 1951, **7**, No. 6, 15-18.

The Expt Sta. for Beet Cultivation of Rovigo has prepared a programme of field trials to ascertain the possibilities of sugar-beet in southern Italy, particularly in Campania and Calabria.—E.B.

138 Simon, M. L'étude de la conservation de la betterave depuis l'arrachage jusqu'à la fabrication. [**Conservation of sugar-beet from lifting to processing.**] *Publ. Inst. belge Amél. Better.* 1951, **19**, 22-55, bibl. 55. [Inst. Amél. Better., Tirlemont, Belgium]

Measures adopted in the USA, Canada, Great Britain, Denmark, Western Germany, Switzerland, Italy, France, the Netherlands and Belgium are outlined. Frost damage is discussed [see next Abstract].—D.B.

139 Decoux, L. La protection des racines de betterave contre le gel. [**Protection of sugar-beet roots from frost.**] *Publ. Inst. belge Amél. Better.* 1950, **18**, 229-54, bibl. 12, English and Flemish summaries pp. 253-4. [Inst. Amél. Better., Tirlemont]

In Belgium the life of the sugar-beet should normally be completed between 20 March and 15 November. Frost damage to sugar-beet begins when the ground temperature falls to −3°C. Mild frost injures only those beets which have been lifted, not those still in the ground. In Belgium the danger begins in mid-October. By mid-November frosts are severe and all beets should have been lifted. Frost damage can be avoided by harvesting before mid-October, or, if this is impossible, by harvesting the crop at such a rate that it can be delivered to the factory on the day of harvesting. When the crop is particularly heavy this is impossible. The beets must then be conserved in temporary silos or otherwise protected from frost. Methods of protection suitable for large- and small-scale farming are described for use during mild and severe frosts.—D.B.

140 Aguzzi, G. La sarchiatura della bietola. [**The hoeing of sugar-beet.**] *Industr. saccar. ital.* 1951, **44**, 147-53, bibl. 14.

In Italy, where weed infestation in sugar-beet crops is relatively light owing to the limited extent of permanent meadows and the presence of cleaning crops in the crop rotations, there is a tendency to reduce the number of hoeings given to this crop. Since hoeing is reputed not only to control weeds, but also to improve the water economy of the soil, the Agronomy Institute of Bologna University undertook a series of trials to determine the value of hoeing. One trial was carried out in 1949 at Corticella, and 4 trials in 1950 in different environments in the Po Valley. The trials must be continued for some years before definite conclusions can be reached. The following preliminary conclusions are advanced: (a) when spring rainfall is high, as in 1949, or when there is a long spring-summer drought, as in 1950, repeated hoeing seems to have a limited effect on the water economy of the soil and, in consequence, on yield, particularly when the soil is clear of weeds; (b) the efficacy of hoeing increases as weed infestation becomes greater; (c) under the conditions of the trial, there was no advantage in hoeing more than twice after thinning the crop.—E.B.

141 Pendelton, R. A. **Soil compaction and tillage operation effects on sugar-beet root distribution and seed yields.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 278-85, bibl. 5. [Oregon Agric. Expt Sta., Corvallis]

Field trials were carried out to determine the effect of a number of tillage practices on the growth and seed yield of sugar-beet stecklings and on the pore space of Chehalis sandy loam soil compacted to about 5% non-capillary porosity. Rotary tillage to a depth of 8 to 9 in. resulted in the best growth of sugar-beet stecklings and the best soil structure, being markedly superior to shallow cultivations. Deep chisel cultivation under the sugar-beet rows was only slightly less effective than rotary tillage. All the treatments that resulted in good soil aeration caused slight increases in sugar-beet seed yields and demonstrated the advisability of deep tillage for this crop. Deep side-dressings of fertilizer in spring resulted in yields of about 200 lb. per ac. more seed than equal amounts of fertilizer broadcast and irrigated into the soil.—P.J.B.

142 Gaskill, J. O. **Effects of wilting, drought and temperature upon rotting of sugar-beets during storage.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 653-9, bibl. 6. [Colorado Agric. Expt Sta., Fort Collins]

The results are given of trials to determine the effect of the wilting of roots in the field after harvest on the keeping-quality of roots stored (a) for 13 weeks at 65°F. and (b) for 19 weeks at 45°F. Roots wilted for 0.5 hr. in the field showed very little rot, while each successive increase of 0.5 hr. caused significant increases in the percentage of rotted roots at both storage temperatures. Roots that had lost 15.4% of their moisture content by wilting in the field for 4 days showed 7 or 8 times as much rotting during storage as those wilted for 0.5 hr. [See also *Fld Crop Abstr.* 3 : 1377] In further trials, sugar-beet plots that were well watered until 27 August were divided into those receiving no further irrigation after this date and those receiving irrigation on 13 September and

5 October. The weather was dry after the last general irrigation until harvest time. The average weight of the roots from the dry plots was slightly ess and the sucrose content slightly greater than that from the irrigated plots, but the total sucrose yields for both did not differ significantly. Followng storage at 65°F. for 96 days and at 45°F. for 139 days, the percentage of rotted roots from the dry and irrigated plots, were 43.3 and 33.9 and 28.8 and 14.4, respectively. In similar trials in which roots from plots receiving no water after 29 August and plots irrigated once and twice, respectively, after that date, were stored for 2 months, there were no significant effects of drought on rot development during storage, though the average amount of rotting in roots held at 65°F. during storage was 15 times that of roots held at 45°F. —P.J.B.

143 PENDLETON, R. A. **Effects of freezing of sugar-beets being overwintered in the field for seed production in western Oregon.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 122-6, bibl. 5. [Oregon Agric. Expt Sta., Corvallis]

Normal winters in western Oregon are almost ideal or inducing seed-stalk formation in plants left to overwinter in the field from early autumn sowings. Temperatures rarely drop below 20°F., and the average temperature for December, January and February is usually between 40 and 45°F. However, during the winter of 1948-49, the mean monthly temperatures were abnormally low, with emperatures in January remaining below 32°F or nearly the whole month. Many sugar-beet plants had badly frozen crowns and appeared to be too injured to recover. Later, however, almost all the plants recovered and produced normal seed-stalks. Seed yields from the best-yielding fields, which were seriously damaged by frost, ranged rom 3500 to 4000 lb. per ac., compared to 2000 o 4000 lb. per ac. for the highest-yielding fields ollowing normal winters. The root size of the rosted plants at seed harvest time appeared to be considerably above normal and the plants showed a endency to continue vegetative growth for a onger period after harvest. It is postulated hat under the abnormal conditions of the winter quoted, an insufficient amount of the factor that nduces bolting was present in the plants, so that hey remained longer in a vegetative, or semi-vegetative condition.—P.J.B.

44 DECOUX, L. Perfectionnements apportés à la préparation superficielle du sol, en liaison avec le semis précoce de la betterave sucrière. [**Improvements in shallow cultivation of the soil in relation to early sowing of sugar-beet.**] *Publ. Inst. belge Amél. Better.* 1950, **18**, 201-27, bibl. 32, Flemish and English summaries pp. 226-7. [Inst. Amél. Better., Tirlemont, Belgium]
[See *Fld Crop Abstr.* 3 : 464 and 887]

145 JAEHNL, G. Ergebnisse der Rubenversuche des Jahres 1950. [**Results of beet trials for the year 1950.**] *Vers. Ergebn. Bundesanst. alp. Landw. Admont* 1951, No. 11, pp. 37. [Bundesanstalt für Alpine Landwirtschaft, Admont, Austria]

The yields of 19 varieties of sugar-beet are presented in 20 pages of tables and diagrams. The great differences in yield obtained from the same variety when grown in different localities is noteworthy. These are attributed to the great diversity in climate found within a small area in alpine regions.—D.B.

146 WAUTHY, R., and ROUSSEL, N. Étude de la résistance à la montée en graines des variétés de betterave sucrière utilisées en Belgique. [**Resistance to bolting in varieties of sugar-beet employed in Belgium.**] *Publ. Inst. belge Amél. Better.* 1950, **18**, 191-6, bibl. 5, English and Flemish summaries p. 196. [Inst. Amél. Better., Tirlemont, Belgium]

As a result of tests carried out during 1946-50, varieties of sugar-beet have been classified in descending order of resistance to bolting as follows: Rabbethge et Giesecke E, Kuhn P, Star of Svalöf 015, X-E, Dippe Frères, Zwaanesse II, Hilleshög, Pedigree, and Johnson's Perfection E. —D.B.

147 WAGENINGEN, Netherlands Institute of Varietal Research. [**Report on selection of varieties of fodder beet and mangolds.**] *Bericht over Rassenkeuze* Nos. 100, 101, 102, and 103, 1951, pp. 4, 3, 2 and 8.

These reports give summarized details of several years' varietal trials with fodder beet and mangels. The strains of both are grouped into 3 categories, containing 10 to 14, 14 to 17 and 17 to 23% dry matter, respectively. The strains tested are briefly described and data are given of their root and leaf yields, dry-matter content, tendency to bolt, ease of lifting and storage qualities. [The information contained in these reports has been largely derived from the 26th Descriptive List of Field Crop Varieties, 1951, published by the State Committee for the Compilation of Varietal Lists of Field Crops, Wageningen.]—P.J.B.

148 PANELLA, A. Prove su tre varietà di barbabietola da zucchero in Umbria. [**Trials with three sugar-beet varieties in Umbria (Italy).**] *Industr. saccar. ital.* 1951, **44**, 154-8.

A trial was carried out in 1950 in the Tiber Valley to compare 2 new sugar-beet varieties with the local variety and to determine the best sowing and harvesting dates in this valley. The 3 varieties are indicated as E, P and Z. The experimental field consisted of 40 plots of 31 sq. m. each. Each plot had 6 beet rows, the distance between the rows being 40 cm. The climate during the growing season was extremely unfavourable, being characterized by high temperature and 3 months' drought from June to August. The average root-yield of variety E was higher than the yield of P and Z, but the differences in sugar yield per ha. between the 3 varieties were small. When comparing a sowing on 18 February with one on 14 March, the latter being normal in the region, there was an increase of 50 kg./ha. daily in the sugar yield in favour of the earlier sowing. A comparison of harvesting on 28 August with harvesting on 19 September showed a higher root yield per ha. from the later sowing, but a higher sugar yield from the earlier sowing. The September rain influenced the crop unfavourably in that the sugar percentage in the root decreased.—E.B.

149 Murphy, A. M., and others. **Performance of three male-sterile sugar-beet hybrids.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 184-6. [Sugar Plant Invest. Div. Plant Industry Bur., US Dept Agric.]

The summarized results of trials with three male-sterile hybrids, S.L. 6105, S.L. 6106 and S.L. 7101, are given. The hybrids gave significantly higher yields of sucrose per ac. than the commercial variety U.S. 22/3. They were resistant to curly top disease, had a smooth, clean root and showed resistance to petiole and crown rot, although they appeared to be very susceptible to downy mildew and *Cercospora* leaf spot. The future possibilities of using male-sterile hybrids are outlined.—P.J.B.

150 Deming, G. W. **Recent results with sugar × red garden beet hybrids.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 180-3, [Colorado Agric. Expt Sta., Fort Collins]

Trials are reported in which two selections of F_3 sugar-beet × red globe garden beet have, in general, exceeded the root yield of a commercial control variety of sugar-beet; but they had a slightly lower sucrose content. In gross yield of sucrose per ac., there was little difference between the selections and the control variety. The trial results indicated that the varietal characters of the selections were not materially altered by multiplication for commercial use and that the production of hybrid sugar-beet varieties from wide crosses was practicable.—P.J.B.

151 Savitsky, V. F. **Monogerm sugar-beets in the United States.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 156-9, bibl. 3. [Sugar Plant Invest. Div., Plant Industry Bur., US Dept Agric.]

A review is given of progress made in the production of monogerm sugar-beet. 5 monogerm plants were found in Oregon among the variety Michigan Hybrid-18, which is the only variety in which monogerm seed plants have so far been found. Of the 5 found, only two (designated S.L.C. Monogerm 101 and 107) could be considered as truly monogerm. These monogerm selections had non-shattering, round, uniform seed, showed strong non-bolting tendencies, produced normal sugar-beet type seedlings and were very constant in their monogerm character. The monogerm selections had a type of branching not previously noted in the genus *Beta* and which consisted of either a lateral branch, or a single fruit, but never both together, borne in the axil of a leaf. A comprehensive breeding programme with races S.L.C. 101 and 107 has begun at Salt Lake City and should make possible the commercial use of monogerm plants in 1952-53.—P.J.B.

152 Harvey, P. **Processed seed: its value to the farmer.** *Brit. Sug. Beet Rev.* 1951, **19**, 99-104. [Norfolk Agric. Sta.]

The article discusses what can be done to speed up singling of sugar-beet through the use of processed seed. This is of value to the farmer in relieving pressure of work in the late spring and ensuring that the work is done at the right time so as to avoid losses. The problem has been tackled in three ways: the treatment of seed to reduce the number of sprouts which develop from each cluster; improved drilling to sow this processed seed more regularly in the row; and the reduction of the continuous stand to a series of bunches by mechanical cross-hoeing.—K.L.

153 Pack, D. A., and Owen, F. V. **Viability of sugar-beet seed held in cold storage for 22 years.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 127-9. [Sugar Plant Invest. Div., Plant Industry Bur., US Dept Agric.]

On 8 March, 1928, samples of the German variety Braune were placed in refrigerated storage at temperatures ranging from −10°F. to +10°F. After 22 years' storage at these temperatures, the germination of the seed was 75%, or about 10% less than that at the time of placing in storage. Field tests indicated that the plants grown from such seed were of normal vigour and sugar content. —P.J.B.

154 Amsterdam, N. V. Hollandsch Zweedsche Zaad Maatschappij. Hilleshög Broch. No. 8. Remstoffen en de kiemkracht van suikerbietenzaad. [**Inhibitive substances and the germination power of sugar-beet seed.**] By *R. H. Visser* and *T. Arts.* 1945, pp. 12, bibl. 9. [Duplicate copy in French] [Dutch-Swed. Seed Co., Amsterdam (R.H.V.); Neth. Seed

Inspect. Serv., Wageningen (T.A.); Govt Seed Test. Sta., Wageningen (W.J.F.)]

The brochure contains two articles. The first, by R. H. Visser, gives a concise account of present knowledge on recently discovered substances which inhibit germination in sugar-beet and other seed. The nature, so far as is known, of these substances; their function under natural conditions and the ways in which they may be used or, when desired, removed; their relation to soil exhaustion and to climate respectively; and their effect on the accuracy of germination tests are described. The second article, by T. Arts, discusses germination tests with special reference to sugar-beet seed, which should have a germination power of at least 75%. While the testing of original seed from a trustworthy source should be unnecessary, seed of 1 year or older should be tested because germination power diminishes, to varying degrees, with the length of storage. The difficulties of obtaining accurate determinations are, however, very considerable and only a well-equipped laboratory is in a position to make them satisfactorily. Netherlands growers are advised to apply to the Government Seed Testing Station at Wageningen.—G.M.R.

155 FREED, V. H., and PENDLETON, R. A. **Weed control studies on sugar-beets.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 459-62. [Oregon Agric. Expt Sta., Corvallis]

Sugar-beet seed was sown on 28 June on plots previously tilled to encourage the germination of weed seeds. 11 days after sowing the sugar-beet the following herbicides were applied as pre-emergence treatments: 1 and 1.5 lb. per ac. Na salt of 2,4-D; 16, 20 and 40 lb. per ac. of ammonium TCA; 2, 4 and 8 lb. per ac. emulsifiable IPC; 30 gal. per ac. of Shell 20 (aromatic oil); 20 gal. per ac. of diesel oil; 1 qt. per ac. of Dinitro general (3,5 dinitro-O-secondary butyl phenol). Except where volumes of herbicide are indicated all herbicides were applied at 40 gal. per ac. The Dinitro general gave the best results; beet stands averaged 107.3% of the control and a weed control of 88.2% was obtained. Shell 20 gave almost complete weed control, but enough of the material remained as a residue to reduce beet emergence to 32.6% of that of the control. The Na salt of 2,4-D gave good weed control, but severely damaged the sugar-beet. IPC did not appear to affect sugar-beet stands, but gave poor control of broad-leaved weeds. TCA gave reasonably good weed control and did not seriously reduce sugar-beet stands, though it is thought that if the soil moisture content had been higher, greater damage to the sugar-beet would have resulted. In further trials, in 1948, for selective grass control in autumn-sown sugar-beet grown for seed, sugar-beet sown in early September was sprayed when in the 2- to 6-leaf stage with 1, 3 and 5 lb. per ac. wettable IPC, 1, 3 and 5 lb. per ac. emulsifiable IPC and 1, 3 and 5 lb. per ac. emulsifiable IPC + 5 gal. diesel oil. In all cases, the 3 lb. per ac. rate of IPC gave good grass control with no significant effects on the sugar-beet. The 5 lb. per ac. emulsifiable IPC + 5 gal. diesel oil caused damage to the sugar-beet, while 5 lb. per ac. wettable IPC caused only slight growth retardation. No data are given for this latter trial. In further trials in 1948 and 1949, very satisfactory results were obtained from applications of 4 to 10 lb. per ac. IPC to sugar-beet having 4 to 12 leaves; applications of 4 to 6 lb. per ac. IPC were sufficient to give good grass control when applied before the tillering stage of the grass. Applications of more than 6 lb. per ac. of IPC retarded the growth of the sugar-beet, as did also smaller applications made before the sugar-beet reached the 4-leaf stage.—P.J.B.

156 DENNING, G. W. **Use of IPC for weed control in sugar-beets.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 453-5. [Colorado Agric. Expt Sta., Fort Collins]

At Fort Collins, Colorado, on 25 April, 1949, applications of 10 lb. per ac. of IPC were made to the soil, harrowed lightly, and followed immediately by the sowing of 2.3 and 4.3 lb. per ac. of good quality sheared sugar-beet seed. A few days after sowing heavy rain occurred. On 18 May, the plants on both untreated control plots and the IPC-treated plots were beginning to show their first pair of true leaves. The control plot plants were vigorous and normal, while the IPC-treated plants were pale-green and smaller in size than the controls. On 1 June, the control plot plants had 4 to 6 true leaves, were growing rapidly, and were about twice the size of the IPC-treated plants, while the latter appeared to be making normal, though delayed, growth. On 9 June, all the plots were thinned. On 1 July, the IPC-treated plants appeared to be equal in vigour to the controls. There were no significant differences between the yields of the controls and the treated plants sown at the 4.3 lb. per ac. rate. At the 2.3 lb. per ac. sowing rate, the IPC caused a definite reduction in yields. At thinning time, the control plots were moderately weed-infested, while those treated with IPC were essentially clean. It was estimated that under the conditions of the trials, the IPC ceased to affect the sugar-beet 4 weeks after its application.—P.J.B.

157 PASINETTI, L. Osservazioni sulla cancrena della barbabietola da *Sclerotium rolfsii* Sacc. [**Observations on southern blight of sugar-beet caused by *Sclerotium rolfsii* Sacc.**] *Ann. Fac. Sci. agr. Univ. Palermo* 1950, **1**, 213-20, bibl. 5.

This disease causes serious damage to sugar-beet crops in Italy and other Mediterranean countries.

Wild forms of *Beta vulgaris*, as well as many other species, are affected. In sugar-beet, the rot starts in the collar; it then affects first the leaves and later the root. In a field trial in which sugar-beet plants were infected artificially, the disease developed much more rapidly in young than in older plants, but all the plants died in the end. Trials of preventive vaccination of beet by Carboni's method were unsuccessful. To control southern blight, it is necessary to modify the environmental conditions under which sugar-beet is grown. Compact soil and stagnant water are particularly favourable to the spread of the disease. The optimum temperature for its development is 30°C. combined with high air humidity.—E.B.

158 BLENCOWE, J. W., and TINSLEY, T. W. **The influence of density of plant population on the incidence of yellows in sugar-beet crops.** *Ann. appl. Biol.* 1951, **38**, 395-401, bibl. 11. [Rothamsted Expt Sta., Harpenden]

The incidence of yellows virus in sugar-beet crops was reduced by increasing the density of plant population. The differences in susceptibility between large- and small-topped varieties, and between early- and late-sown crops, could not be attributed solely to differences in plant size. It is suggested that close planting would increase the yield of sugar-beet and reduce the losses caused by yellows virus. The roguing of infected plants during the early part of the growing season did not reduce the incidence of disease.—From authors' summary.

159 ULRICH, A. **Sugar-beet grown in controlled climates.** *Through the Leaves* 1951, **39**, 31-5. [Earhart Plant Res. Lab., California Inst. Technol., Pasadena]

Experiments at the Earhart Plant Research Laboratory, Pasadena, have demonstrated the existence of a general relationship between night temperature, root growth and sugar production. The maximum weight of roots was obtained by growing sugar-beet at night temperatures between 57 and 79°F., the range 68 to 73°F. being most conducive to high root-weights. At night temperatures of 36°F., the sucrose content of roots was 12% (root weight 200 g.), declining almost linearly to 7.5% at 79°F. (root weight 440 g.). The highest total sucrose production took place at slightly lower night temperatures than those producing highest root weights, with the highest production of sucrose taking place at 57°F. The average root weights at 68, 73 and 79°F. day temperatures, were 307, 392 and 413 g. per root, with a sucrose content of 9.2, 9.16 and 8.52%, respectively. Variations in day temperatures had little effect on total sucrose production. Where sugar-beet was grown in 8 hr. light periods at 73°F., followed by 16 hr. dark periods at 63°F. and in normal light periods ranging from 10 hr. in January to 14 hr. in May, the roots grown in the full light periods were double the weight of those grown in the 8 hr. light periods, while the sugar content and top size were almost the same for the two groups. None of the roots grown under the experimental conditions described above reached the same sugar content as commercially grown roots. It is thought that the high nutrient status of the substrate on which the experimental roots were grown resulted in such rapid growth as to prevent the build-up of high concentrations of sucrose.—P.J.B.

160 AFANASIEV, M. M., and others. **Physiology of growth, sugar accumulation and mineral intake of sugar-beets.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 275-7. [Montana Agric. Expt Sta., Bozeman]

In trials at Huntley, Montana, sugar-beet was grown continuously from 1942 to 1949 on plots receiving yearly applications per acre of: (a) 125 lb. ammonium sulphate, (b) 125 lb. triple superphosphate, (c) 12 tons farmyard manure, (d) 125 lb. triple superphosphate + 12 tons manure, (e) 125 lb., each of ammonium sulphate and triple superphosphate + 12 tons manure. The control plots were untreated. The average weight ratios in 1948 and 1949 between the root weight of the control plots and plots (a) and (b), and of the control plots and that of plots (c), (d) and (e) was 1 : 2.6 and 1 : 2.4, respectively. Where seedling emergence took place on about 15 May, only those roots which had reached a weight of 0.5 lb. by early August produced good sugar yields. A good top-growth early in the season was essential for satisfactory final yields; results showed that where the tops of sugar-beet plants which had emerged on May 15 weighed about 0.5 lb. by mid-July, good sugar yields were obtained. For 1948 and 1949, the average ratios of the number of leaves formed by early August on the control plots and plots (a) and (b), and on the controls and plots (c), (d) and (e) was 1 : 1.6 and 1 : 1.4, respectively. On the basis of top to root ratios, satisfactory proportions of 35 to 40% for tops and 60 to 65% for roots were found on all plots except (a) and (c), on which the proportion of tops to roots was too great. The sugar content of the roots increased rapidly until the end of July and from then onward at a reduced rate, particularly in September. The sugar content in the beginning of August of roots from the control plots and plots (a) and (b) was at least 2% higher than that of roots from plots (c), (d) and (e). This fact was thought to be of use in providing a factor of negative correlation for estimating final sugar yields—P.J.B.

161 STOUT, M., and SMITH, C. H. **Studies on the respiration of sugar-beets as affected by bruising, by mechanical harvesting, by severing into top and bottom halves, chemical treatment, nutrition and variety.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 670-9. [Sugar Plant Invest. Div., Plant Industry Bur., US Dept Agric.]

method of measuring the rate of respiration and poilage of samples of up to 88 lb. weight of sugar-eet in an atmosphere of constant composition nd temperature, is described. The bruising of oots caused by mechanical harvesting did not ause an appreciable rise in the rate of respiration r spoilage compared with that of undamaged oots. Roots severed into top and bottom halves efore storage had a higher rate of spoilage and espiration than intact roots. The top halves of oots respired more rapidly than the bottom halves, hile the bottom halves had the highest rate of poilage. Intact roots showed greater sugar losses rom the top than the bottom halves, indicating hat translocation of sugar does not compensate or the relatively greater losses of sugar from the op halves. Barsprout, a compound containing he methyl ester of naphthalene acetic acid greatly ncreased the rootlet growth and respiration of he roots. This compound is not recommended or preserving sugar-beet during storage. The esults indicated that heavy manurial treatments id not improve the storage quality of roots, ompared with that of roots given normal manurial reatment. In studies of the respiration of 8 arieties tested, including a Barres mangel and a odder beet variety, there was an apparent posi-ve correlation between the sugar content and ne respiration rate of the roots during storage. here is evidence from varietal differences in the lationship between the sugar content and respiraon of the roots that there are possibilities of reeding commercial varieties with low rates of spiration during storage.—From authors' sumary.

62 MAKAROV, B. N. [**The effect of length of day on the development and yield of sugar-beet in the first year of growth.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **74**, 837-40, bibl. 5. [All-Union Res. Inst. Beet Husbandry]

he day lengths compared were those of Moscow nd Kiev, and a day length two hours shorter han that of Kiev. The greatest difference in length day between the northern and southern regions curs in June-July. During that time sugar-beet the northern regions is weakly developed and as a small leaf-surface, the weight of a plant about 1 July being 10 to 15 g. Therefore, ese small plants react feebly to a lengthened otoperiod during June-July. With the advance of sugar-beet, or other crops, to more northerly regions there occur small differences in length of day, compared with the original zone, which are not sufficient, however, to influence the growth and development of the plants to any great extent. Length of day is not the decisive factor determining the growth and development of such plants in the more northerly regions. Temperature and moisture of the atmosphere as well as the provision of water and nutrients are of fundamental importance in the acclimatization of the plants to new conditions.—R.P.J.

163 MANN, H. H. **The effect of manures on the bolting of the beet plant.** *Ann. appl. Biol.* 1951, **38**, 435-43, bibl. 3. [Woburn Expt Sta., Husborne Crawley, Bletchley, Beds.]

Bolting in sugar-beet was not significantly increased by the application of potash or superphosphate, or a mixture of both, when applied at or before sowing time. Dung applied prior to sowing markedly increased bolting, while ammonium sulphate (possessing approximately the same stimulating effect as the dung) caused slightly more bolting than dung. The reason why beet plants bolt more in one season than another is discussed. Experiences described in this paper suggest that a check to the plants when in an early stage of growth, whether caused by dryness, waterlogging or low temperature, followed by a vigorous growing period, may have an effect on the degree of bolting.—K.L.

164 AMSTERDAM, N. V. Hollandsch Zweedsche Zaad Maatij. Hilleshög Broch. No. 7. De invloed van standruimte, stikstof en kali op suikerbieten. Resultaten van vijf jaar proefvelden. [**The influence of planting distance, nitrogen and potassium on sugar-beet. Results of five years' field experiments.**] By *R. H. Visser.* 1943, pp. 14. [Duplicate copy in French] [Dutch-Swed. Seed Co., Amsterdam]

Experiments were conducted from 1937 to 1941 in fourteen different places and on soils ranging from very heavy clay to gravel and sand. A comparison of 86,000 and 63,000 plants per hectare showed that the higher density of plants produced an increase in yield of 1060 kg. roots and 1550 kg. leaves per ha., a sugar content higher by 0.44%, and an average increase in sugar yield of 550 kg. per ha. Although doubling the normal application of N resulted in increased yield of roots and leaves, it produced an average decrease of 1.21% in sugar content and a decrease of 24 kg. per ha. in the yield of sugar, but the reduction in sugar content was less when the number of plants per unit area was greater. The application of K, compared with no K, increased sugar yield by 129 kg. per ha. Findings are compared with those of other workers.—G.M.R.

165 Gaskill, J. O. **Progress report on the effects of nutrition, bruising and washing upon rotting of stored sugar-beets.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 680-6, bibl. 5. [Colorado Agric. Expt Sta., Fort Collins]

Three varieties of sugar-beet were grown on plots near Fort Collins, Colorado, on a field that was low in general fertility. Applications of 0 and 50 lb. K_2O; 0, 100 and 300 lb. P_2O_5 per ac. and 0, 50 and 150 lb. N per ac. were made in all combinations to the plots. The average root yield for the plots receiving 300 lb. per ac. P_2O_5 was 1.24 tons above those where no P was applied, though the sucrose content of the roots was the same. The root yields where 0, 50 and 150 lb. N per ac. were applied, were 9.07, 10.8 and 12.44 tons per ac., with a sucrose content of 16.59, 16.55 and 15.92%, respectively. There were no interactions between the varieties and the manurial treatments. Two samples of the roots from each of the plots receiving different manurial treatments were stored, one for 3 months at 65°F. and the other for 4.5 months at 45°F. None of the manurial treatments significantly affected the storage quality of the roots, except that for roots receiving no N the average percentage of rotted roots stored at 45°F. was twice that of the roots from plots receiving 150 lb. N per ac. In further trials a comparison was made between the storage quality of roots: (a) washed, dried, uninjured; (b) washed, dried, bruised; (c) unwashed, uninjured (1.7% adhering soil, by weight); unwashed, bruised (1.3% adhering soil, by weight, after bruising). The roots were stored for the times and at the temperatures quoted for the previous trial. At both storage temperatures, there was relatively little influence of washing on storage quality and little interaction between washing and bruising. Rotting was more severe in damaged than undamaged roots at both storage temperatures, the difference being significant at 65°F. Severe bruising or gouging served as a pathway to fungal invasion, while mild bruising or abrasion had little effect on rotting.—P.J.B.

166 Jakovleva, V. V. [**The influence of boron on the conversion of phosphoric compounds in plants.**] [Russian] *Doklady Akad. Nauk SSSR.* 1950, **75**, 95-8, bibl. 8. [All-Union Inst. Fert. Agrotech. and Soil Sci.]

In experiments with sugar-beet an increased content of organic phosphorus compounds was observed in the leaves of plants which had received boron.—R.P.J.

167 Martynov, G. A. [**The effect of boron-magnesium manure on the seed yield of fodder beet and carrots.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 5, 62-5. [Dept Agric. Čuvaš. ASSR]

When 20 kg. per ha. of finely ground boron-magnesium dust, containing up to 15% boric acid, were applied at the beginning of flowering and during mass flowering to the seed plots, it is claimed that the seed yield of fodder beet was raised by 50%.—R.P.J.

168 Gaskill, J. O. **Possibilities for improving storage-rot resistance of sugar-beets through breeding.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 664-9, bibl. 3. [Colorado Agric. Expt Sta., Fort Collins]

Twenty-nine strains of *Beta vulgaris*, including sugar-beets, garden beets, one mangold variety and a number of crosses of sugar-beet with garden beet and mangold were stored for (a) 4.5 months at 45°F. and (b) 3 months at 65°F., to determine the keeping quality of the different strains. The results showed highly significant differences between the keeping quality of the different strains at both storage temperatures. Exceptionally low rotting percentages were found in two garden beet varieties. There were strong contrasts between certain groups of strains, i.e. those descended from a line 1833 source were of much higher keeping quality than those descended from a line 1846 source. A large number of roots of two of the strains used in the above trials, that were found to differ widely in rotting percentages, were artificially inoculated with *Phoma betae* and stored. The roots differed greatly in their rate of rotting. These results are held to justify the conclusion that breeding for storage-rot resistance in sugar-beet should be feasible.—P.J.B.

169 Price, C., and Fife, J. M. **A convenient method of preserving sugar-beet pulp for analysis.** *Proc. Amer. Soc. Sugar Beet Technol. 1950.* 1950, 218-20. [Sugar Plant Invest. Div, Plant Industry Bur., US Dept Agric.]

CASSAVA

170 O Agronômico. Cultura de Mandioca. [**Cultivation of cassava.**] *O agronômico, Campinas* 1950, **1**, No. 10, 1. [Received 1951]

The four cassava varieties 59- Branca de Santa Catarina, 63- Cafelha, 103- Brava de Itú and 192- Itú yield about 30% more than Vassourinha, which is the most widespread variety in Brazil, the first two being more resistant to bacteriosis and the last two more resistant to stem twist (brocas do caule) than Vassourinha. The variety 454- Guaxupe, resistant to bacteriosis but more susceptible to stem-twist, is excellent both for the table and as a forage. The two varieties 108- Holandi do Itagua and 60- Preta show promising esistance to the virus which causes proliferation. pplications of 1 ton of bone meal or 1.5 tons of uperphosphate per alqueire [2.42 ha.] have led to ncreases of 30 to 40% in yield, but N and K are neffective. Experimental results have shown hat: the optimum planting period is May-ugust; the best planting material is mature etts 40-50 cm. long, planted in an inclined posi-ion and buried 10 to 15 cm. deep, but, since this ystem is expensive in setts, the use of setts 20-30 m. long, planted horizontally 10 cm. deep and well overed with compressed earth, is recommended; ptimum spacing is 1 m. × 0.60 cm.—N.G.S.

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71 Rosen, G. von. **Problems and methods in the production of tetraploids within the genus *Beta*.** *Socker Handl.* 1949, **5**, 197-217, pl. 5, bibl. 8. [Swed. Sugar Co. Beet Breed. Inst., Hilleshög, Landskrona, Sweden]

he usual methods of producing polyploids with olchicine being insufficiently effective within the enus *Beta*, a new technique, in which colchicine applied to seedlings, has been evolved by the uthor and is described.—G.M.R.

72 Stewart, D. **Sulphuric acid scarification of seedballs of *Beta trigyna* and other *Beta* spp.** *Proc. Amer. Soc. Sugar Beet Technol.* 1950, 100-2. [Sugar Plant Invest. Div., Plant Industry Bur., US Dept Agric.]

he germination of hard-seeded species of *Beta* equently does not exceed 1%, 14 days after owing. In the trials reported, concentrated $_2SO_4$ (sp. gr. 1.84) was added to the seed of hard ed-coat *Beta* species slightly in excess of the nount of acid the seed would absorb when stirred. or the seed-balls of monogerm species, such as . *procumbens*, *B. patellaris*, *B. webbiana* and . *lomatogona* and the small seed-balls of *B. igyna*, acid scarification for 2 hr. has given ermination percentages of up to 50. For the rge seed-balls of *B. trigyna*, a total of 5 hr. cid scarification is necessary. The development temperatures above 60°F. in the seed during eatment should be avoided. After acid treat-ent the seeds should be washed in a large volume water, charred material being removed from e seed-coat and the seed given a final washing dilute lime-water before drying. Such acid arification has no place in the production of mmercial sugar-beet seed, but is of value in cilitating field tests of the above mentioned *eta* species.—P.J.B.

3 Schuphan, W. Eine einfache chemische Schnellmethode zur Unterscheidung einiger blauer und grüner Formen von *Brassica-oleracea*-Varietäten in Samen. [**A simple, chemical, rapid method for distinguishing seed of some blue and green forms of varieties of *Brassica oleracea*.**] *Landw. Forsch.* 1950, **2**, 28-31, bibl. 6. [Hamburg]

This is a preliminary communication. Until recently, there was no reproducible method for distinguishing quickly and with certainty between seed of the following pairs of varieties and forms of *Brassica*: (a) *Brassica oleracea* var. *capitata* f. *rubra* and f. *alba*; (b) *B. oleracea* var. *gongylodes* f. *violacea* and f. *alboviridis*; (c) *B. napus* var. *arvensis* and *B. rapa* var. *sylvestris*; and (d) *B. napus* var. *arvensis* and *B. napus* var. *napobrassica*. A new chemical method, practical details of which are given, distinguishes between seed of the anthocyan-bearing forms and those from which anthocyan is absent.—D.B.

FIBRE CROPS

COTTON

174 Colombia, Ministerio De Agricultura. Algunos datos sinteticos sobre el cultivo del algodon. [**Some condensed data on the cultivation of cotton (in Colombia).**] *Agric. Trop.* 1950, **6**, No. 10, 13-16.

The cultivation of cotton in Colombia, from the initial preparation of the soil to the final ploughing in, is described. An average temperature of 28°C. is required, and cotton will grow from sea-level to over 1000 m.a.s.l. The best varieties for the Tolima region are Deltapine 12 and Express del Brasil. In the Espinal-Tolima area, the optimum sowing date lies between 15-20 Feb. for the first six-month season, and between 20 Aug. and 5 Sept. for the second season. On fresh land the optimum spacing is 1.10 m. × 0.40 m., and on old land, 1.0 m. × 0.30 m., with two plants per hole. The recommended seed rate for the above varieties is 30-40 kg. per ha. Deltapine yields 750 kg. of seed cotton per ha., with 34% fibre. The cost of production from the initial preparatory ploughing to packing and ploughing in the crop residue is about $400 per ha.—N.G.S.

175 Rodríguez C., J. M. Consejos practicos para el cultivo del algodon. [**Practical advice for the cultivation of cotton (in Costa Rica).**] *Seulo Tico* 1950, **4**, 116-36, 221-33.

The first part of this article deals in detail with the cultivation of cotton. The varieties recommended for Costa Rica are Delfos and Deltapine 14. The second part deals with the life histories and control of insect pests and with cotton diseases. 2% γ-isomer of BHC, 15% Chlordane, or calcium arsenate dust where the first two are not available, are recommended at a rate of 9 lb. per acre for almost all pests and diseases. In Nicaragua, BHC gave better control of *Nezara viridula* than Chlordane.—N.G.S.

176 Sokolova, N. F. **[The effect on the water regime of cotton of cultivating it after a herbage break in a grass/arable rotation.]** [Russian] *Doklady Akad. Nauk SSSR* 1950, **74**, 847-50, bibl. 6.

In an experiment with cotton of the early ripening variety No. 2172 bred at the Azerbaijan Agricultural Research Institute, it was found that the plants following a herbage break in a grass/arable rotation, in contrast to those on old plough land, tolerated in August a lengthening of the inter-watering period to 21 days without detriment to the yield.—R.P.J.

177 Iltis, J. Considérations générales sur la culture du coton aux États-Unis. [**General observations on cotton cultivation in the USA.**] *Terre marocaine* 1951, **25**, 145-8, bibl. 7.

178 Gonçalves Martins, R. São Gonçalo dos Campos, zona algodoeira. [**São Gonçalo dos Campos, cotton zone (of Brazil).**] *Bol. Minist. Agric. Rio de J.* 1946, **35**, Nos 1-12, 1-19, illus. [Received 1951] [Esta. Exptl de S. Gonçalo, Estado de Bahia, Brazil]

Of 95 cotton varieties tried since 1939, the following showed most promise for the region around São Gonçalo :—H-105, Texas, Express, Delfos, Serigí, H. Paraibano, Piratininga, Acala, Gattooma and Russell 4630. In a sowing-date experiment, no significant differences resulted from seven sowings between 20 May and 19 July. One plant per hill yielded as much as two or three plants per hill. A significant increase in yield resulted from the application of 150 kg. of Chile saltpetre and 300 kg. superphosphate per ha. 50 kg. potassium chlorate gave no significant result, nor did 50 kg. N. Applications of superphosphate alone, however, gave favourable results.—N.G.S.

179 Frey, H. Tratamiento de la semilla de algodon con acido sulfurico. [**Treatment of cotton seed with sulphuric acid.**] *Agric. Trop.* 1950, **6**, No. 10, 37-40.

Sulphuric acid treatment of cotton seed results in an increased germination percentage and more rapid germination. In the variety Deltapine, germination was increased from 68% to 96% when seed was treated with concentrated sulphuric acid for 90 seconds. In the laboratory, treated seed germinated within 24 hours ; and in the field within 2 days. Protection is given against fungi and insects—in particular against the pink boll-worm (*Platyedra gossypiella*)—and the seed-rate can be considerably reduced. The construction and operation of a simple hand-worked device for treating cotton seed with concentrated sulphuric acid is described. Three men using this machine can treat 500 kg. of seed in 8 hr. The cost of treatment (in Colombia) is $0.494 per kg.—N.G.S.

180 Grindley, D. N. **Changes in composition of cottonseed during development and ripening.** *J. Sci. Food Agric.* 1950, **1**, 147-50, bibl. 7. [Wellcome Chem. Lab., Sudan Med. Serv., Minist. Health, Khartoum]

Analyses have been made of cottonseed (*Gossypium hirsutum*) at different stages of maturity after flowering, and the results have been recorded in tables and graphs. It is seen that no appreciable oil develops in the seed until about the 35th day [after flowering], when it increases rapidly ; the carbohydrates decrease over this period. The protein and ash contents increase steadily more or less in proportion to the weight of seed, but the crude fibre shows a sharp increase shortly before full maturity is reached.—From author's summary.

181 Crafts, A. S. **Response of several crop plants and weeds to maleic hydrazide** *Hilgardia* 1950, **20**, 57-80, bibl. 5.

Preliminary trials have shown that maleic hydrazide is particularly effective against young grasses against which 2, 4-D is normally ineffective. Tests were carried out with a number of crop plants to which sprays of the water-soluble diethanolamine salt of maleic hydrazide at concentrations of 0.1 0.2, 0.4 and 0.8% were applied. In trials with 10-, 20-, 29- and 44-day-old cotton, sugar-beet and water-grass (*Echinochloa crus-galli*) plants spray damage was much more severe in the younger than in the older plants. At the 20-day-old stage (cotton with 4 true, expanded leaves and water-grass 15 cm. high with 5 true leaves) the 0.2% sprays stopped the growth of the water-grass at once, while the 0.1% sprays caused it to tiller profusely and severely stunted its growth The cotton plants grew and flowered normally following 0.1% sprays. After 0.2% sprays, the plants flowered normally, but were slightly stunted. The 0.4 and 0.8% sprays retarded growth and caused leaf malformation. The main shoot of 10-day-old cotton plants receiving 0.2% sprays was completely inhibited in growth above the cotyledonary node, while 44-day-old plants receiving 0.4% sprays were only slightly inhibited in growth. The new growth of 44-day-old sugar-beet plants following 0.1, 0.2 and 0.4% sprays was inhibited to some extent. Applications of 0.1, 0.2 and 0.4% maleic hydrazide sprays were made to 16 plant species when 20 days old. Results showed that the 0.2% sprays killed water grass, Johnson grass (*Sorghum halepense*), rice and milo and caused stunting in flax, beans and Sudan grass (*Sorghum sudanensis*). Sweet corn (*Zea mays*) was apparently unaffected by the 0.2% applications. Maleic hydrazide was apparently translocated to the meristematic regions of the plants. Water-grass plants receiving 4 applications of 1% or 2 applications of 0.2% maleic hydrazide spray at weekly intervals were slightly less inhibited in growth compared to plants receiving one application of the full 0.4% spray, though at 34 days from the date of spraying, the plants receiving the split applications were as severely affected as those receiving the full application, indicating that the repeated applications were additive and that breakdown of maleic hydrazide in the plants was slow.—P.J.B.

182 DASTUR, R. H. **The "bad opening" of bolls in the Egyptian cottons in the Gezira scheme, Anglo-Egyptian Sudan.** *Emp. Cott. Gr. Rev.* 1951, **28**, 183-94. [Indian Cent. Cott. Cttee, Bombay]

"Bad-opening" of American cotton bolls (*Gossypium hirsutum*) in the Punjab, India, is a condition in which the bolls and seeds are mostly immature, the seeds cracking when pressed with the fingers. The lint from such bolls is weak and immature. The condition results in a greatly reduced yield of seed-cotton. In Egyptian cotton bolls (*G. barbadense*) growing in the Sudan, "bad opening" shows only premature boll cracking and immature lint formation, the seeds being hard and sound. The yield of seed-cotton in this case is average, even though the number of seeds in the badly-opened bolls is greatly reduced. Observations on the causes of bad opening of cotton-bolls in the Punjab indicate that similar, if not identical, causes may operate in the case of cotton in the Sudan. Some of the probable reasons discussed are: (a) nitrogen deficiency in saline, clay soils on which the cotton is growing, (b) water strain, (c) potash deficiency in the soil, (d) early sowing, (e) the occurrence of spells of hot weather during bolling, so upsetting the water balance of the plants.—K.L.

183 PERRIER de la BATHIE, H. Distribution et ecologie du *Gossypioides brevilanatum* (Hochr.) Hutchinson de Madagascar. [**Distribution and ecology of *Gossypioides brevilanatum* (Hochr.) Hutchinson of Madagascar.**] *Rev. Bot. appl.* 1951, **31**, 231-2, bibl. 2.

Besides *Gossypioides brevilanatum*, which has no value as a fibre plant, *Gossypium herbaceum* var. *perrieri* is also an endemic species of Madagascar. The latter is considered of interest because of its strong, but short, lint, its thick bolls, which resist most cotton pests, and its drought resistance.—E.B.

184 KYLEBJAEV, V. G. [**Change in the structure of the flower in the genus *Gossypium* as a result of vegetative hybridization.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **78**, 1219-21, bibl. 14. [Trukmen Expt Sta., All-Union Inst. Cott. Prod.]

As a result of grafting species of *Gossypium* possessing different chromosome numbers, a change was effected in the structure of the staminal column, one of the generic characters of cotton.—R.P.J.

185 ARUTJUNOVA, L. G., and GUBANOV, G. Ja. [**The biology of fertilization of cotton.**] [Russian] *Agrobiologija* 1950, No. 6, 94-9. [Cent. Breed. Sta., All-Union Sci. Res. Inst. Cott. Prod.]

186 JOHAM, H. E. **The nutritional status of the cotton plant as indicated by tissue tests.** *Plant Physiol.* 1951, **26**, 76-89, bibl. 16. [Texas Agric. Expt Sta., College Station]

Colorimetric and turbidimetric methods were used for the determination of soluble nitrate nitrogen, phosphorus, potassium, calcium, and magnesium. The level of the five nutrients in the petioles reflected the availability of their individual ions in the substrate. Thus, 90-day-old field-grown plants gave positive correlations when nitrogen, phosphorus, potassium, calcium or magnesium of the petiole were compared with their respective concentrations in the substrate. In a greenhouse experiment significant correlations were obtained between tissue concentrations and substrate levels for nitrate nitrogen, phosphorus, and potassium 30 days after emergence. A knowledge of interactions between nutrient elements is essential for proper evaluation of tissue test results.

Tissue tests can play an important part in determining the nutritional status of cotton plants. They may be of considerable value as an early means of predicting yields, and give indication of deficiencies before the typical deficiency symptoms appear.—D.B.

187 MCILRATH, W. J. **Response of the cotton plant to maleic hydrazide.** *Amer. J. Bot.* 1950, **37**, 816-19, bibl. 9. [Texas Agric. Expt Sta., College Station]

Since the growth-regulator type of weed killer (e.g. 2,4-D) is extremely injurious to cotton, new selective herbicides are of particular interest in the Cotton Belt. An experiment was designed to determine the effect of relatively high concentrations of maleic hydrazide on the growth and chemical composition of young cotton plants. "35-day old Stoneville 2B cotton plants were sprayed with an aqueous solution containing an equivalent of 2400 and 4800 ppm of maleic hydrazide. 26 days after application, the sixth and seventh main-stem leaves were harvested for histological observation and chemical analysis. To determine if plant age at the time of application of this compound influenced the plant's vegetative and fruiting response, plants which were 53 days old were sprayed with an aqueous solution of 4800 ppm of maleic hydrazide. Both series treated at 35 days of age had a cessation of apical growth of the main stem and renewed growth took place only through developing vegetative laterals. The main-stem leaves present on the plant at the time of spraying increased in thickness due to cell enlargement. The 53-day-old plants sprayed with maleic hydrazide exhibited no apparent inhibition of main-stem growth although these plants did produce a larger number of vegetative laterals than the controls. Main-stem leaves of these plants present at the time of treatment with maleic hydrazide also increased in thickness. All spray treatments with maleic hydrazide increased the time interval from planting of the seed to maturity of the first boll and reduced the seed cotton produced per plant. Reduced yield of cotton was accounted for in the 2400 treatment by a decrease in boll size, while in both 4800 treatments it was due to a reduction in boll number. Chemical analysis of the leaf blades showed the maleic-treated plants to contain much larger quantities of labile carbohydrates than the controls. This accumulation probably occurred because of impaired translocation due to collapse of elements of the phloem. Whereas carbohydrates tended to accumulate with maleic hydrazide treatment, the plant constituents extractable with ether were reduced."—D.B.

188 ERGLE, D. R., and EATON, F. M. **Succinic acid content of the cotton plant.** *Plant Physiol.* 1951, **26**, 186-7, bibl. 7. [Texas Agric. Expt Sta., College Station]

Succinic acid, on the basis of dry weight, was found to be present in successively lower concentrations in leaves, bolls, flowers, seed kernels, petioles, stems and roots. The percentage in these organs ranged between 0.07 in the roots and 0.4 in the leaves.—D.B.

189 SKRJABIN, F. A., and others. [**The application of granulated superphosphate beside the row when sowing cotton on grey earths.**] [Russian] *Sovet. Agron.* 1950, **8**, No. 5, 72-6. [Ak-Kavak Cent. Agrotech. Sta., All-Union Res. Inst. Cott. Prod.]

This practice permitted a considerable reduction in the annual norm of phosphoric acid manuring and increased the yield of cotton.—R.P.J.

190 GARDNER, V. R., and MONCADA, F. Un aparato barato para medir la humedad del algodon. [**A cheap apparatus for measuring the humidity of cotton.**] *Agric. Trop.* 1951, **7**, No. 3, 9-14, illus.

An illustrated description of the apparatus is given, together with instructions for its use.—N.G.S.

191 PEDRAZA, R. Comentarios al articulo: un aparato barato para medir la humedad del algodon. [**Commentary on the article "a cheap apparatus for measuring the humidity of cotton".**] *Agric. Trop.* 1951, **7**, No. 4, 55-8.

The value of the apparatus described in the previous abstract is questioned.—N.G.S.

192 ALEKSANDROV, V. G. [**The application of silicic bacteria to cotton.**] [Russian] *Doklady Vsesojuz Akad. S.-H. Nauk* 1951, 25-33, bibl. 3. [Res. Inst. Cott. Prod.]

Pot experiments conducted in 1950 in which the effect of the application of silicic bacteria to cotton was investigated are reported. The favourable effect of the bacteria was shown by an increase not only in the yield of raw material, but also in the height of the plants, and in the number of leaves, buds and ovaries.—R.P.J.

FLAX

193 TARIMAN, C. [**Some experimental work: 11. Flax as a fibre plant: an estimate of its technological aspect, based on agriculture and botany.**] [Turkish] *Ankara Univ., Fac. Agric.*, Publ. No. 22, 1950, pp. 295. [Received 1951]

194 WAGENINGEN, Netherlands. Flax Institute and Institute for Varietal Research. Bericht over rassenkeuze. Vezelvlas, 1951. [**Report on selection of varieties. Fibre flax, 1951.**] *Vlugschr. Nevi* No. 5. Ber. IVRO No. 99, 1951, pp. 4.

The Netherlands Flax Institute's Leaflet No. 5 and Report No. 99 of the Netherlands Institute for Varietal Research give an account of varietal trials of flax in different parts of Holland in 1950 and describe the chief characteristics of the different varieties.—G.M.R.

OIL CROPS

SUNFLOWER

195 ILLINOIS Agricultural Experiment Station. Circ. 681. **Sunflowers as a seed and oil crop for Illinois.** By *R. O. Weibel.* 1951, pp. 16.

Practical recommendations are given for growing sunflowers in Illinois. The crop should not be grown in the rotation more than once in 4 years.

pril or May appears to be the best time for sow- ng. In spacing trials, there have been little ifferences between the yields of plants grown in ow widths ranging from 21 to 40 in. For row idths of 40 in., plants should be spaced 6 to 12 in. long the row; where closer row spacing is used, lants should be more widely spaced along the row. imited trials on soil of good fertility showed that unflowers responded to K, but not to P, or N, hen either was applied alone. On less fertile oils, sunflowers showed a definite response to K nd Ca. For Illinois conditions the following 7 arieties are recommended: Sunrise, Advance, rrowhead, Jupiter, Illinois Common, Manchurian, nd Grey Stripe. Brief notes are given on each ariety.—P.J.B.

96 Kuzjmin, V. P. [**Sunflower, variety ŠOS-41.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 5, 34-6. [Babaev Šortandinsk Agric. Expt Sta.]

OS-41 (Sortandinskiĭ 41) was obtained by open ollination of the local Atbasarsk sunflower with a rge collection of non-regional varieties. It ripens 90 to 95 days, or 10 to 14 days earlier than the gional variety Saratov 169. It flowers and pens uniformly. Compared with Saratov 169 it ves a slightly higher yield, has a lower husk ntent and a higher fat content. The stem is of edium height (120 cm.); the seed is dark grey. nce 1949, ŠOS-41 has been grown in individual ovinces.—R.P.J.

7 Barker, C., and Hilditch, T. P. **The influence of environment upon the composition of sunflower seed oils. I. Individual varieties of sunflowers grown in different parts of Africa.** *J. Sci. Food Agric.* 1950, **1**, 118-21, bibl. 3. [Univ. Liverpool]

nflowers grown from named varieties of seed in uthern Rhodesia, Kenya and Tanganyika give ed oils of somewhat varying composition, but the ed oils from all varieties grown in any one loca- n are practically identical in composition. milarly, sunflower seed oils grown in three fferent parts of Zanzibar from two sorts of seeds lack and cream) are widely different in composi- n; here the oils from black seeds were some- hat more unsaturated than those from the cream eds, but the main difference again is connected th the place of growth and, more specifically, ems to be connected with the rate of develop- nt of the seed. Seed harvested only 2 months ter planting gave oils of extremely low unsatura- n which, indeed, were not dissimilar from oundnut oils in linoleic acid content.—From thors' summary.

8 Barker, C., and Hilditch, T. P. **The influence of environment upon the composition of sunflower seed oils. II. Composition of the seed oils of sunflowers grown in English gardens from five specimens of different African sunflower seed.** *J. Sci. Food Agric.* 1950, **1**, 140-4, bibl. 5. [Univ. Liverpool]

Five specimens of sunflower seeds from Africa, the oils in which varied widely in composition (44—72% linoleic acid), were grown in three English gardens in West and East Cheshire and Kent. The composition of the resulting English-grown seed oils was broadly the same in all cases, irrespective of the seed sown. Most of the oils contained, on an average, 68-70% of linoleic acid, but the extreme range of linoleic acid varied from about 60 to 75%. The apparent explanation of these subordinate differences may lie in the effect of direct sunlight on the ripening seed heads, since flower-heads that became completely inverted and faced downwards gave the oils with highest linoleic acid content; others, in which the stems turned more or less through 90° so that the heads were more freely exposed to direct light, gave oils with somewhat reduced linoleic acid content. It is concluded that varietal factors play little part in determining the composition of sunflower seed oils. The main effect is that high linoleic content is conditioned by slow development and ripening of the seed, and vice versa; climatic (temperature) conditions and also, probably, the degree of incidence of light on the ripening seed heads are the factors which control the rate of development of the seed and also the relative unsaturation of the seed oil.—Authors' summary.

199 Alekseev, A. P. [**The interaction of the grafted components in sunflower (*Helianthus annuus*) in relation to the resistance of the latter to broomrape (*Orobanche* sp.).**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **74**, 333-6, bibl. 6. [Don Expt Sel. Sta. Oil Crops, Rostov-on-Don]

Results of grafting experiments with sunflower in 1949-50 are reported. When scions which were not resistant to broomrape were grafted on to resistant stocks, represented by the root system and the foliar part of the stem, the plants grown from the seeds of the grafted scions showed reduced *Orobanche* infection compared with plants grown from seed from the non-grafted scions.—R.P.J.

200 Bottazzi, G. B. La variabilità morfologica nel girasole (*Helianthus annuus* L.). [**The morphological variability in sunflower (*Helianthus annuus* L.).**] *Genet. agr.* 1950, **2**, 169-85, bibl. 5, English summary p. 185. [Ist. naz. Genet., Roma]

A study of morphological and physiological characters of the sunflower was carried out with some Russian and Italian varieties and an ideal type of plant was determined, towards which improvement work on this crop should aim. The characters of this ideal plant are: height not over 1.50 m.; moderate development to allow a density of 3 to 4 plants per sq. m.; 18 to 24 medium-size leaves; strong stem with single medium-size inflorescence containing medium to large seeds having thin walls and a high oil content. It is thought that if suitable homogeneous varieties were available, sunflower cultivation could be developed in Italy.—E.B.

201 PRJANIŠNIKOVA, Z. D. [**Disturbance of the conductive system in sunflower (*Helianthus annuus*) in the absence of boron.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **78**, 1029-32, bibl. 2. [Timirjazev Akad. Agric., Moscow]

Results are reported of a 1948 investigation in which sunflower was grown in water cultures with and without boron. In the absence of boron, derangement of the conductive system occurred which began as early as the time of differentiation of the vessels from the cambium. No changes were noted in the cambium itself.—R.P.J.

202 BOTTAZZI, G. B. Pigmentazioni antocianiche nel girasole (*Helianthus annuus* L.). [**Anthocyanic pigmentations in sunflower (*Helianthus annuus* L.).**] *Genet. agr.* 1950, **2**, 186-92, bibl. 6, English summary p. 192.

RAPE

203 TIDSSKRIFT FOR PLANTEAVL. Artsforsøk med olieplanter. [**Comparative trials with oil-seed crops (in Denmark).**] *Tidsskr. Planteavl* Medd. 454, 1951, **54**, 351-2.

Comparative trials were carried out during 1944-49 with summer rape (Danish), mustard. Mahndorfer opium poppy and oil radish (German), grown on clay soils at Lyngby and Aarslev and on peat soil at Højer. Manurial treatment on clay soil was 100 to 200 kg. per ha. superphosphate, 100 to 300 kg. potassic fertilizer and 600 kg. nitrochalk; on the peat soil, treatment was 0 to 200 kg. superphosphate, 0 to 100 kg. potassic fertilizer and 100 to 250 kg. per ha. nitrochalk. Seed yields varied widely from year to year, particularly in the case of oil radish on the clay soils and opium poppy on the peat soil (the latter by reason of poor germination). On the clay soil, average seed yields of mustard, summer rape, opium poppy and oil radish were 17.6, 14.3, 13.4 and 11.6 hkg. per ha., and on the peat soil 15.0, 10.3, 7.7 and 9.5 hkg. per ha.; crude oil yields on the clay soils were 451, 494, 551 and 385 kg. per ha., and on the peat soil, 384, 356, 316 and 315 kg. per ha., respectively. Data are given showing: the time of beginning and ending of flowering, time of ripening and the straw yields of the four crops.—P.J.B.

204 HÖRBERG, Y. Råd vid odling av höstoljeväxter. [**Advice on the cultivation of autumn oil crops (rape and rybs in Sweden.**] *Lantm. Svenskt Land* 1951, **35**, 598-9.

205 EIFRIG, H. Beitrag zur Unterscheidung von *Brassica*-Samen. [**The distinction between seeds of *Brassica*.**] *Landw. Forsch.* 1950, **2**, 219-29, bibl. 7. [Samenprüfstelle Münster, Germany]

A laboratory method is described for distinguishing between the seeds of the winter and summer forms of *Brassica napus* (rape) and *Brassica napus* var. *esculenta* (swede). The diagnostic features are the form of the cotyledonary leaf and the first foliage leaf of the resulting seedlings when 3 weeks old. In winter and summer rape, the length of the cotyledonary leaf is half that of its greatest width, while in the swede the length is two-thirds of the width. The first foliage leaf in winter rape is pointed at base and tip; in summer rape there are both symmetrical and asymmetrical leaves, some of which are bent outwards; in the swede, the leaf is the shape of an upright egg and varies to oval and to circular. The shapes of the leaves are illustrated.—D.B.

206 WAHLIN, B. Bekämpning av kålbladlusen. [**Control of cabbage aphid.**] *Svensk Frötidn.* 1951, **20**, 46-7.

Of late years, the prevalence of cabbage aphid (*Brevicoryne brassica*) in Sweden has become very serious in cruciferous oil crops, particularly in summer rape. Applications of DDT, BHC and Parathion have proved ineffective and have often benefited the aphid by killing off its natural predators. Among measures recommended for cabbage aphid control are: autumn-sown oil crops should be substituted for spring-sown crops in areas where heavy populations of aphid are known to occur; the distance between spring- and autumn-sown crops should be as great as possible and the spraying of crops to control flea beetles, etc., should only take place where absolutely necessary.—P.J.B.

PERILLA

207 BALDRATI, I. Pianta di olio siccativo meritevole di coltivazione. [**A drying-oil plant worth growing.**] *Humus, Milan* 1951, **7**, No. 8, 14-15.

Some general information is reported on *Perilla ocymoides* which is widely grown for oil in Japan. In the Milan district, some garden escapes of this species, var. *nanchinensis*, have become naturalized. It is thought that this plant could be profitably grown for oil in Italy.—E.B.

208 FROLOV, P. V. **[New regions of cultivation of oil flax, *Perilla* and *Lallemantia*.]** [Russian] *Selek. Semenovod.* 1951, **18**, No. 1, 47-52.

In the USSR more than 60% of the oil-flax crops are found in the Central Asiatic republics (Tadzhik and Uzbek SSR) on unirrigated soils. The average yield of flax there for the last 10 years has not exceeded 4.2 centners (centner = 100 kg.) per ha. In the eastern regions of Siberia, the northern provinces of Kazakhstan, in the south-east, as well as the central black soil provinces and the Ukraine, the yields of oil-flax are two-and-a-half to three times as large as the average Central Asiatic yields. In all the provinces of Siberia and Kazakhstan suitable for the cultivation of oil-flax, improved regional varieties have been introduced, among them the variety Sibirak bred by the Barnauljsk State Selection Station. This variety is characterized by high yield, a high oil content and tall growth. Until recently the main region of cultivation of *Perilla* was the Far East, but as early as 1940 a large area was cultivated in the Ukraine. Data from trials conducted during 1940-49 show that the seed yield of *Perilla* in the Ukraine is about twice as large as in the Far East. Up to 1940 *Lallemantia* was cultivated only in the North Caucasus. In trials from 1940-49, on the experimental grounds of the Stalingrad and Rostov provinces, of the Krasnodar and Stavropol territories and of the southern provinces of the Ukraine, *Lallemantia* gave high, uniform yields. Its seeds are rich in oil which is of better quality than linseed oil.—R.P.J.

LAND USE, SURVEYS AND MANAGEMENT

209 BUCHANAN, K., and HURWITZ, N. **Land use in Natal.** *Econ. Geogr.* 1951, **27**, 222-37, illus. [K.B., Univ. Coll., Ibadan, Nigeria; N.H., Univ. Natal]

The three dominating features of agriculture in Natal are the medium or low productivity of much of the land, the failure to meet the nutritional requirements of the inhabitants in pre-war days, and the urgency of the need to expand agricultural production to meet the needs of the rapidly increasing population. Various aspects of land utilization are considered and illustrated with small maps, and a composite map of land-use regions is drawn up. A diagram of production zones is also presented. Except in the cases of sugar and wattle, there appears to be no correlation between physical environment and land use. —N.G.S.

210 TEAKLE, L. J. H. **Notes on the soils of coastal Queensland and portions of the hinterland with special reference to the tropical latitudes.** *Pap. Fac. Agric. Univ. Qd* 1950, **1**, 1-40, bibl. 19.

The opinion is expressed that on the black clay and brown alkaline soils studied, there are great opportunities for agricultural development by the use of drought-resisting and quick-growing summer cereals, such as grain sorghum and millets.—K.L.

211 CRARY, D. D. **Recent agricultural developments in Saudi Arabia.** *Geogr. Rev.* 1951, **41**, 366-83, bibl. in text, illus.

The agricultural development of Al Kharj, Khafs Daghra, and Hofuf, all in Saudi Arabia, is discussed. Future demonstration projects are planned for the oases of Quatif and Taif. These are the conception of the Saudi-Arabian government, and are being carried out with the aid of American advice. Water supply presents the basic problem. Pumps provided to lift water from the natural limestone wells have already reduced the ground water-level, consequently unless the water consumption is regulated so that it does not deplete the natural supply, the improved area is likely to revert to desert in due course. A further problem is presented by the alkaline nature of the water which renders the ground unsuitable for cropping after it has been irrigated for some time. The only apparent methods of controlling this salinity are electrical precipitation, deep ploughing or subsoiling, plus adequate flushing. But flushing would further reduce the water supply, Salinity also renders tile drainage useless, since the drains would rapidly become crusted up.—N.G.S.

212 ROJAS HUNEEUS, F. Chile en su aspecto agricola. **[An agricultural view of Chile.]** *El Campesino, Chile* 1951, **83**, 25-41, illus.

The Chilean climate is very varied, with an annual rainfall ranging from 80-1000 mm. in different parts of the country. Of a total area of 74 million ha., about 19 million ha. are of agricultural value, and it is estimated that a further 12 million ha. are suitable for supporting agriculture. Of the utilized area, 13 million ha. are uncultivated, being restricted to natural pasture. Of the cultivated area of 6 million ha., 1.2 million ha. are under arable crops, 1.268 million ha. under artificial pastures, 2.9 million ha. under natural pastures, and the balance under vineyards, orchards and planted timber. The agricultural development of the last half century is reviewed ; the area under cereals has doubled and the area under artificial pastures has trebled. The political and economic complications of Chilean agriculture are discussed. Increased agricultural production is urged and the methods advocated to achieve this include: the increase of the arable area and the area under irrigation; the cultivation of sugar-beet (which is considered of the highest importance) using improved methods of cultivation, better seeds and fertilizers.—N.G.S.

213 CHENG-SIANG CHEN, **Land utilization in Formosa.** *Geogr. Rev.* 1951, **41**, 438-56, illus. [Inst. Agric. Geogr., Nat. Taiwan Univ., Taipei, Formosa]

Of the total area of utilized land in Formosa in 1947, 66% was cultivated. Of this cultivated area, 41% was occupied by paddy fields and only 0.1% by pastures. 95% of the cultivated land lies in the five western hsiens [provinces]. The average rent for a paddy field was about 48% of the value of the produce, the figure being 33% for dry fields. Average farm size was very small. 26% of the farm families worked farms of less than 0.5 ha., 46% operated farms of less than 1 ha., while less than 1% operated farms of more than 10 ha. Owing to the favourable climate, most of the cultivated land carries two harvests a year. Consideration is given to multiple cropping and to the rotations in use. The intensity of the farming in Formosa lies between that of the Philippines and Siam on the one hand, and that of Japan on the other. The irrigation systems have been extended annually since the Japanese occupation in 1901. A series of 33 maps illustrates all aspects of land utilization, including the distribution of individual crops.—N.G.S.

214 MOELLER, O. Können wir unsere wertvollen Moore verbessern? [**Can we improve our valuable moorland?**] *Dtsch. Landw.* 1950, **4**, 50-3. [Rostock, Germany]

The various types of moorland are defined. In the Eastern zone of Germany low moor occupies 490,000 ha. of a total moorland area of 500,000 ha. The most important measure in bringing this land into production is the regulation of the water content of the soil (by drainage, by building dams for water retention and by cultivation measures which keep the ground compact) in order to provide the necessary environment for arable crops, such as winter rye, oats, barley, sugar-beet, potatoes, vegetables and hemp. Cultivation of moorland is expensive, but results in bringing new land into production.—D.B.

215 BLETON, —. Le Maroc agricole. [**Agriculture in Morocco.**] *Terre marocaine* 1951, **25**, 253-9.

This review of the agricultural situation in Morocco includes data on the cultivation of cereals, legumes, oil crops and cotton.—E.B.

216 BELL, A. F. **The land and water resources of Queensland.** *Qd agric. J.* 1951, **72**, 187-205.

217 VERMONT Agricultural Experiment Station. Bull. 539. **Boron for Vermont soils and crops.** By *A. R. Midgley* and *D. E. Dunklee.* 1947, pp. 20. [Received 1951]

The symptoms of boron deficiency in sugar-beet, maize and oats are described. Recommendations are given for the amount of boron required to prevent boron deficiency and a tabulated list is given of the boron status of Vermont soils. Of 39 different soil types tested, only 22 contained sufficient boron for full plant development.—P.J.B.

218 HOON, R. C., and DHAWAN, C. L. **Natural flora as an index of soil quality II.** *Indian J. Agric. Sci.* 1951, **20**, 185-96, bibl. 7, illus. [R.C.H., Cent. Waterpower, Irrig. Navig. Comm., New Delhi; C.L.D., Irrig. Inst., E. Punjab]

Peganum harmala indicates soil of normal texture with a fairly high content of salts. *Calotropis procera* indicates light sandy soil with very low salt content and alkalinity. *Saccharum munja* indicates a wide range of generally poor soils, but all with a fairly high water table. *Suaeda fruticosa* indicates highly deteriorated soil, only one step removed from being completely devoid of vegetation.—N.G.S.

FARMING SYSTEMS AND PRACTICES

219 McKEON, B. F. **Ley farming [in Victoria].** *J. Dep. Agric. Vict.* 1951, **49**, 241-7.

Investigations on the clover ley system at Rutherglen Vict., Australia, have shown: (a) the superiority of subterranean clover pasture over natural pasture for restoring fertility to regularly cropped land, (b) that the length of time necessary under a subterranean clover ley to restore fertility for growing cereal crops varies according to the particular soil and climate. From *Herb. Abstr.*—K.L.

220 WRIGHT, S. J. **Some agricultural problems of Pakistan.** *J. R. Soc. Arts* 1951, **99**, 573-83.

A broad picture is given of agriculture in Pakistan, with special reference to ploughing. The operative part of a normal Pakistan plough is a wooden point tipped with iron which really does no more than scratch the land. The use of machinery to provide better and more timely cultivations is advocated.—N.G.S.

221 SUDAN, Ministry of Agriculture. Mem. Res. Div. No. 14. **Goz soils of the Anglo-Egyptian Sudan and shifting cultivation on the clay plains of the Central Sudan.** By *T. N. Jewitt.* 1950, pp. 6. bibl. 4. [Minist. Agric., Wad Medani, Anglo-Egyptian Sudan]

The Goz soils of the Kordofan and Dafur provinces are maintained under shifting cultivation, the resting phase of which carries *Acacia senegal.* In the clay plains of the central areas, the operation of shifting cultivation is restricted by the shortage of permanent water supplies and particularly by the lack of drinking water at harvest time. As there is no shortage of cultivable land, the author advocates the development of water supplies by the provision of haffirs so that shifting cultivation, with the aid of *harig* or fire cultivation, may be extended.—K.L.

222 CHURCH, R. J. H. **Irrigation in the inland Niger delta of the French Sudan.** *Geogr. J.* 1951, **117**, 218-20.

223 BURR, H. **Development of the hill and marginal land of Cornwall.** *N.A.A.S. Quart. Rev.* 1951, No. 12, 178-84, bibl. 1.

This is an account of work done since 1942 by the War Agricultural Executive Committee.—K.L.

224 STEWART, J. G. **Crops for late sowing [in Britain].** *Fmr Stk-Breed.* 1951, **65**, 41, 43.

The crops which can be sown in a late season, such as the spring of 1951, are indicated and their cultivation briefly described.—A.G.G.H.

225 SOUTH AFRICA Department of Agriculture. Sci. Bull. No. 290. **Green manure as a source of phosphate for crops. Pt. 1. Field and laboratory studies.** By *E. R. Orchard.* **Pt. 2. Pot experiments.** By *E. R. Orchard* and *E. J. Greenstein.* [n.d.], pp. 22.

Laboratory studies on soils from various green-manure experiments at Potchefstroom revealed hat green manures decompose fairly rapidly after being ploughed under. The amounts of vailable nitrogen set free as a result of decomposition were not closely correlated with subsequent maize yields. From the results of field and pot xperiments on Potchefstroom soil, it is considered hat the beneficial effects on maize due to green manuring are largely attributable to the phosphate ontent of the green manure. For the purpose of maize production, however, it is better farming practice to use superphosphate than to use green manure, which by comparison is wasteful and inefficient.—From authors' summary.

226 GROOTENHUIS, J. A. De invloed van stalmest en de verbouw van stoppelgewassen op de gewasopbrengsten, het humusgehalte en het magnesiumgehalte van oude esgrond. [**The influence of farmyard manure and the growing of stubble crops on plant yield, the humus and the magnesium content of old soil.**] *Maandbl. LandbVoorlDnst* 1951, **8**, 198-206. [T.N.O. Agric. Expt Sta. and Soil Sci. Inst., Groningen, Netherlands]

An account is given of a permanent experiment, now in its tenth year, at the Heino Experiment Farm. The variously intensive use of farmyard manuring and the growing of second crops (turnips grown in the stubble of rye, and rye grown in the stubble of oats) were tested for their effect on the yield of the potatoes, rye and oats which formed the unvarying rotation. Both measures proved very beneficial, the dung increasing the humus content of the soil and providing nitrogen and magnesium. An average annual application of approximately 35 tons dung per ha. is sufficient in the Heino field to maintain magnesium supplies at an adequate level, and is approximately equivalent to an average annual application of 35 kg. MgO per ha. when applied to the rotation potatoes/rye/oats. The stubble crops produced a higher magnesium level in the soil than did an autumn-winter fallow.—G.M.R.

227 PENNSYLVANIA STATE COLLEGE Agricultural Experiment Station. Bull. 533. **Trends and variations in yields from the Jordan fertility plots.** By *O. Nissen* and others. 1950, pp. 18.

Statistical analysis of the yields of oats, wheat and maize grown on the Jordan soil fertility plots during 1882 to 1937 showed that, in terms of crop yields, the level of fertility of the plots could be maintained by farmyard manure plus complete commercial fertilizers. The annual yield variations attributable to weather conditions were 20 to 40% of the mean yields, while the maximum annual deviations were 40 to 80% of the mean yields. Large annual variations in crop yields were apparently unpredictable and difficult to explain on the basis of weather conditions. The yield of one crop in the rotation was apparently not correlated with that of other crops during the same year.—From authors' summary.

228 SWEDEN, Agricultural Engineering Institute. Medd. Nr. 235. Handledning vid skördetröskning. [**A guide to combine harvesting.**] By *M. Berg* and *S. Persson.* 1951, pp. 75, illus.

A valuable publication covering all aspects of the combine harvesting of cereal and oil crops.—P.J.B.

229 ENGLAND and WALES, Ministry of Agriculture and Fisheries. Leafl. No. 15. **Fixed equipment of the farm. Shelter belts for farmland.** 1951, pp. 12.

SOIL AND WATER CONSERVATION

230 GEYTENBEEK, P. E. **Erosion losses—controlled by straw cover.** *J. Dep. Agric. S. Aust.* 1951, **54**, 391, 400.

Results of experiments carried out at the Waite Agricultural Institute, South Australia, on water and soil erosion, showed that nearly fifty times as much soil was lost from bare plots as from plots covered with straw-mulch. Of the total rain falling on the plots from May to September, 11.8% was lost from the bare plot while only a 0.5% loss of rain was recorded from the mulched plots.—K.L.

231 SUAREZ CASTRO, F. Relaciones entre las lluvias y la erosion. [**Relationship between rainfall and erosion (in Colombia.**] 1950, **6**, 45-7.

Figures given for 1949 show that over half the soil erosion losses at Chinchiná, Colombia, were caused by only eleven intensely heavy downpours out of 246 showers recorded.—N.G.S.

232 EL SALVADOR, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 6. Drenaje de tierras agrícolas. [**Drainage of agricultural land (in El Salvador).**] By *J. E. Flannagan* and *R. Cabezas R.* 1950, pp. 3.

If drainage is to be effective in improving land in El Salvador the following three conditions must be fulfilled: 1. In the low coastal zones, drainage canals must be fitted with gates to prevent the entry of high seas. 2. Mouths of drainage canals discharging into deep ravines must be prevented from eroding. 3. Owing to the prolonged dry season, gates must be fitted to the drains to prevent water from running off during the dry season and thus aggravating the drought.—N.G.S.

233 ISRAEL, Agricultural Research Station, Rehovot. Bull. 49. **Saline soils in the Zevulun Valley.** By *S. Ravikovitch* and *N. B-B. Hava.* 1948, pp. 39, bibl. 29.

Preliminary results of a field experiment in soil reclamation in this valley indicated that by lowering the ground-water level by means of a drainage system, and by removing the bulk of salts through preliminary flooding with a limited quantity of water, these heavy soils could be made fit for successful maize and barley growing, with the assistance of rain and irrigation water.—From authors' summary.

234 NICHOLSON, H. H. **Groundwater control in reclaimed marshland.** *World Crops* 1951, **3**, 251-4, illus. [School Agric., Cambridge]

235 CORMACK, R. M. M. **The mechanical protection of arable land.** *Rhod. agric. J.* 1951, **48**, 135-64.

The article deals with the design, construction and uses of the principal measures (storm drains, contour ridges and grass waterways) in use for protecting arable land.—K.L.

WEEDS AND WEED CONTROL

236 HOLMES, E. **Modern methods of weed control.** *J. R. hort. Soc.* 1951, **76**, 207-16.

This article gives an up-to-date account of the stage reached in the development and application of chemical weedkillers for use on agricultural crops. A brief description is given of the most efficient weedkillers for use against certain weeds, and recommendations are made regarding rates and times of application. Lists are given of weeds in cereals which are (a) susceptible, (b) moderately susceptible, (c) moderately resistant, and (d) resistant to 2,4-D and MCPA. A brief note is given on the use of DNOC as a means of controlling weeds such as cleavers (*Galium aparine*), stinking mayweed (*Anthemis cotula*) and poppies (*Papaver* spp.), which have been allowed to grow beyond the seedling stage. A related product, dinitro-secondary-butyl-phenol (DNSBP), shows promise against the weeds of peas. Pre-emergence sprays of MCPA, 2,4-D and a new chemical iso-propyl-phenyl-carbamate (IPPC) have controlled a wide range of noxious weeds emerging from seed beds of kale, sugar-beet, mangolds, swedes, field beans and peas.—K.L.

237 South Africa, Weed Control Conference. **Chemical weed control in Southern Africa.** *Proc. 1st Southern Afr. Weed Control Conf., Frankenwald Fld Sta., Univ. Witwatersrand, Johannesburg, 1950.* 1951, pp. 48.

The Conference was convened by the University Department of Botany because of the urgent need for the exchange of up-to-date information on the use of chemical weedkillers in Southern Africa. The Conference drew attention to the following crucial matters upon which research might be concentrated in the immediate future: (a) the relation between the chemical structure and activity of herbicides; (b) the effects of herbicides on metabolic processes in the cell, paths of translocation in the plant, physical reactions, blocking effects, etc.; (c) influence of ecological factors, morphology, physiological age and condition of plants on penetration and action of herbicides; (d) resistance of plants to herbicides, whether genetical or acquired, inherited effects (if any) on the progeny of treated plants; (e) the compilation of a preliminary list of plants, describing their susceptibility to different herbicides; (f) the effect upon soils of the continued application of herbicides. The more important papers have been abstracted in this and previous numbers of *Fld Crop Abstr.* and appear in the section Weeds and Weed Control.—K.L.

238 Cock, R. E. **Chemical weed control [in Tasmania].** *Tasm. J. Agric.* 1951, **22**, 64-9, bibl. 1.

An article giving practical advice to farmers. Lists are included of weeds and crops which are susceptible or resistant to 2,4-D, MCPA, and non-hormone weedkillers.—K.L.

239 Kott, S. A. [***Bromus secalinus*** **and its control in crops of winter cereals.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 5, 56-9.

Bromus secalinus, which is widespread in White Russia, Lithuania, Latvia, Estonia, and the northwestern provinces of the European part of the RSFSR, is never found growing alone, but only in cereal crops. It occurs in large amount in winter rye in damp, low-lying fields, especially on heavy, exhausted soils. It was not found by the author in spring cereal crops, but was common in fields of winter wheat of the variety Djurablj. Caryopses of *B. secalinus* retain their viability in the soil for 2 to 2.5 years. Methods of control recommended are: drainage; improvement of soil fertility by the application of dung and granulated fertilizers; separate harvesting and threshing of winter rye from areas infested with *B. secalinus*.—R.P.J.

240 Orchard, H. E. **Three season spraying programme necessary to effect elimination of hoary cress.** *J. Dep. Agric. S. Aust.* 1951, **54**, 381.

Analysis of results of herbicide tests against hoary cress (*Lepidium draba*) indicate that the weed can be controlled by the following programme: A. On arable land, (1) the inclusion in the cropping system of 2 autumn-sown cereal grain crops; (2) the application of 2 lb./ac. MCPA spray on the crops when the hoary cress flower-buds are forming, the spray treatment being repeated in the following season; (3) the seeding of infested areas to either Wimmera ryegrass or oats for grazing in the third year of the rotation, and the spot-treating of any surviving hoary cress plants with 0.2% solution of MCPA applied from a knapsack sprayer. B. On non-arable areas, (1) spraying the weed when in flower with 1 lb./ac. ethyl ester of 2,4-D for two successive seasons, (2) spot-treating the surviving plants with knapsack-applied 0.1% solution of ethyl ester of 2,4-D.—K.L.

241 O Agronômico. Combate a tiririca. [**Nutgrass control (in São Paulo).**] *O. Agronômico Campinas* 1950, **2**, No. 19, 1-2.

In land infested with nutgrass (*Cyperus rotundus*) as many as 80% of the tubers are to be found at depths of up to 20 cm. below the soil surface. The remainder lie at depths between 20-40 cm., although isolated tubers have been found as deep as 60 cm. Mechanical methods of control, other than digging up, are ineffective. DD Shell was found to give more efficient control than Dowfume W-10. Applications were most efficient when given at a spacing of 30 × 30 cm., with 15 cc. per application, (a rate of 125 cc. per square m.). There should be an interval of 20-30 days after treatment and before planting in order that the herbicide should not impede the growth of the crop.—N.G.S.

242 Snyder, W. E. **Responses of quack grass (*Agropyron repens*) to treatment with maleic hydrazide.** *Proc. 5th Northeastern Weed Control Conf.* 1951, 255-65, bibl. 2. [Cornell Univ., Ithaca, N.Y.]

Applications of as little as 5.8 lb. per ac. of maleic hydrazide significantly reduced the number of stems and rhizomes that developed from segments of inactive rhizomes of quack grass. Applications of 29 lb. per ac. completely inhibited rhizome and stem growth, the residual effect persisting in the soil for 49 days after treatment. At rates of 29 and 58 lb. per ac., 0.05% solutions of maleic hydrazide were more effective than 0.1% solutions. Soil applications of 29 lb. per ac. of maleic hydrazide were as effective in controlling quack grass as applications of 100 lb. per ac. of sodium TCA, while foliage applications of 5 lb. per ac. of maleic hydrazide were more effective than similar applications of 100 lb. per ac. of TCA.—From author's summary.

243 LA CHACRA. Los cardos. [**Thistles.**] *La Chacra* 1951, **21**, No. 249, 72, illus.

Sixteen Argentinian thistles are described in brief notes. On arable land, the only method of control is by ploughing and growing cleaning crops in the rotation. So far, herbicides have proved ineffective against all thistles except *Cinera cardunculus*, *Centaurea calcitrapa*, *C. solstitialia* and *C. melitensis*.—N.G.S.

244 HITCHCOCK, A. E., and others. **Growth and reproduction of water hyacinth and alligator weed and their control by means of 2, 4-D.** *Contr. Boyce Thompson Inst.* 1950, **16**, 91-130, bibl. 5. [Tulane Univ., New Orleans, La.]

Applications of not less than 8 lb. per acre of the amine salt or ester of 2,4-D were effective in controlling water hyacinth (*Eichhornia crassipes*), though a second application of 2,4-D was needed to eliminate survivors. At equivalent rates of application, 2,4-D was more effective than 2,4,5-T against *E. crassipes*. Applications in August caused more rapid sinking of this weed than applications in May, June or July. There was no evidence of 2,4-D toxicity in livestock having access to water sprayed with 2,4-D or sprayed *E. crassipes* leaves. Applications of not less than 8 lb. of 2,4-D or 2,4,5-T ester applied in September or October were effective in controlling alligator weed (*Alternanthera philoxeroides*). For this weed, the time of year appeared to be an important factor in the effectiveness of its control for all the herbicides used, except 2,4,5-T. Sprays delivered at 150 lb. per sq. in. pressure, or less, were more effective than sprays delivered at higher pressures. For helicopter applications, 8 lb. of 2,4-D in 40% spray concentrations were most effective, followed by ground-operated 1.25 in. aperture boom-jet sprayers delivering 75 gal. per acre of spray, or less. [See also *Herb. Abstr.* 20 : 557]—P.J.B.

245 MEADLY, G. R. W. **Large scale chemical weed control in crops** [**in West Australia**]. *J. Dep. Agric. W. Aust.* 1951, **28**, 56-62.

Experiments were designed to ascertain the minimum effective dose and the best time to apply DCPA and MCPA for controlling wild turnips (*Brassica tournefortii*) and wild radish (*Raphanus raphanistrum*) in cereal crops. Results showed that 8 oz. per ac. acid equivalent of the sodium salt of DCPA or MCPA in 8 gal. of water gave complete control of wild radish. Applications of 2 and 4 oz. acid equivalent per ac. of the sodium salt of MCPA or DCPA in 8 gal. of water were highly effective in controlling wild turnip. The latter weed was even more vulnerable to these herbicides than was wild radish. The mos favourable time to apply these two weedkiller was when the crop was about 6 in. high. Neithe treatment had an apparent effect on the cereal.—K.L.

246 MOES, A. Action de certains produits herbicides et insecticides sur diverses plante cultivées. L'action des hormones sélectives du type M.C.P.A. et 2,4-D sur le orges de printemps. [**Action of certai herbicidal and insecticidal products o different cultivated plants. Action of selective hormones of the type MCPA and 2,4-D on spring barley.**] *Rev. Agric.* 1950, **3** 475-7. [Sta. Rech. État Amél. Plantes de Grande Cult., Gembloux, Belgium]

The most favourable treatments, as regards actio on weeds and on crop, proved to be 1000 g MCPA per ha., or 1000 g. 2,4-D per ha., applied at the end of tillering. Even with these treatments there was a significant loss in yield o barley. Before using selective hormones on this crop it is therefore advisable to estimate whether any advantage gained by the control of weeds by this method will compensate for the fall in yield. —D.B.

247 LACHMAN, W. H. **Weeding corn** [**maize**] **with chemicals. 2.** *Proc. Amer. Soc. Hort. Sci.* 1950, **56**, 279-82, bibl. 8. [Massachusetts Agric. Expt Sta., Amherst]

Twenty-three different herbicidal treatments were made to maize. The herbicides used included the sodium salt of 2,4-D, granular cyanamide, sodium pentachlorophenate in Dowicide G, dinitro-ortho-secondary-butyl-phenol (DNOSBP) in Dow General Weed Killer, the ammonium salt of DNOSBP in Dow Selective Weed Killer, a mixture of the sodium salt of 2,4-D, and sodium pentachlorophenate and diethyl xanthogen disulphide in a pre-emergence weed killer XP-40A. With the exception of the cyanamide, all the herbicides were diluted with water and applied at a rate of 100 gal. per ac. The most effective pre-emergence herbicides were sodium pentachlorophenate, DNOSBP and the ammonium salt of DNOSBP, while the most effective treatment was 20 lb. per ac. of sodium pentachlorophenate applied shortly after sowing the maize.—P.J.B.

248 CORNELL UNIVERSITY Agricultural Experiment Station. Extn Bull. 821. **1951 weed control in field crops.** By *S. N. Fertig.* 1951, pp. 6.

Brief, summarized recommendations are given for the use of 2,4-D in maize, oats and wheat.—P.J.B.

249 ALFARO-POLANCO, S. Aplicacion de matamalezas en cereales menores. [**Applica**

tion of herbicides in minor cereals (in Colombia).] *Agric. Trop.* 1951, **7**, No. 3, 15-16. [Esta. Agric. Exptl Francisco José de Caldas, Colombia]

The cereals considered are wheat, barley, oats and rye. The optimum time to apply herbicides in wheat is when the wheat is 40 days old. The sodium salts and isopropyl ester of 2,4-D, at rates of 1.5 kg. and 1 litre respectively (each in 500 litres of water) per ha., effectively control *Raphanus raphanistrum*, *Polygonum segetum*, *Rumex* sp., *Chenopodium paniculatum*, *Franseria artemisioides*, and *Brassica campestris*.—N.G.S.

250 PAGE, M. **Comparative activity of various growth substances as herbicides and their future possibilities with special reference to the control of weeds in oats in the Western [Cape] Province.** *Proc. 1st South. Afr. Weed Control Conf. Frankenwald Fld Sta., Univ. Witwatersrand, Johannesburg, 1950.* 1951, 29-32, bibl. 4. [Afr. Explosives and Chem. Industr. Ltd., Somerset West, Cape Province]

o obtain information on the tolerance of oats to erbicides in the Western Cape Province and the ffectiveness of these chemicals in controlling ifferent kinds of weeds, trials were made of two oncentrations of 6 herbicides applied as post mergence sprays. The rates of application were : 1) Fernoxone (80% sodium salt, 2,4-D), 1.5 and .0 lb. /ac. (2) Agroxone (10% sodium salt, Meth-xone), 1.5 and 2.0 gal./ac. (3) Fernimine (39.5% mine salt, 2,4-D), 1 pt. and 4 pt./ac. (4) Veedone (9.6% ethyl ester, 2,4-D), 4 pt. and gal./ac. (5) Un-named product (100% iso-ropyl ester, 2,4-D), 8 and 32 fluid oz./ac., and 5) Un-named product (100% amyl ester, 2,4-D), and 32 fluid oz/ac. In all cases, applications vere in aqueous solution and were sprayed uni-ormly and finely over each plot at the rate of .07 gal. per 100 sq. yd. Applications were made hen the plants were from 5 to 12 in. high. The sters or amine salt formulations at concentrations ot exceeding 8 fluid oz. or 1 pt. per ac. respec-ively gave good results. Sodium salt of 2,4-D nd Methoxone varied in effectiveness of weed ontrol at low concentrations, but gave good esults at applications of not less than 2 lb. or 2 al./ac. respectively.—K.L.

51 TAFURO, A. J., and others. **Comparison of different herbicides, volume per acre and artificial watering after spray application on legume seedlings in mustard infested oats.** *Proc. 5th Northeastern Weed Control Conf.* 1951, 203-8. [Coop. G.I.F. Exchange, Inc., Ithaca, N.Y.]

n trials with a number of herbicides, ACP954 -methyl-4-chlorophenoxyacetic acid) at the rate f 0.25 lb. acid equivalent in 6 gal. water per ac., gave the best mustard (*Sinapis arvensis*) control commensurate with the minimum of injury to the legume crop. Where the volume of spray was increased from 6 to 12 gal. per ac., there was a significant reduction in alfalfa stands. Applications of 600 gal. per ac. of water spray to the crop 2 hr. after the application of the herbicide resulted in an almost significant reduction in alfalfa stands, compared to areas where no water spray was applied. From *Herb. Abstr.*—P.J.B.

252 MARAIS, E. **Spraying of 2,4-D by aircraft.** *Proc. 1st South Afr. Weed Control Conf. Frankenwald Fld Sta., Univ. Witwatersrand, Johannesburg, 1950.* 1951, 20-2. [Industr. Chem. Prod., Johannesburg]

The article describes aerial spraying experiments with 2,4-D on winter wheat in the Transvaal and Western Cape Province during 1950. The ester form of 2,4-D was used because it is oil-soluble and controls many annual weeds at lower dosages than the amine form. The required amount of 2,4-D [figure not given] was applied in 2 gal. of Diesel fuel oil per morgen [2.1165 ac.] being sprayed from a Piper Super 105 aircraft at a height of from 2 to 4 ft. above the growing wheat and a safe working-speed of 60 mph. The aircraft's spraying outfit was fitted with 24 equally spaced nozzles to give a swathe width of 50 ft. Although wheat has been known to be damaged by 2,4-D at almost any stage of its growth, the best time for applying 2,4-D appears to be when the plants had fully tillered and before they had reached the boot stage. If spraying was not accomplished then, treatment was delayed until the kernels had formed and were in the soft-dough stage.—K.L.

253 AMERICAN FERTILIZER AND ALLIED CHEMICALS. **Experimental weedkillers.** *Amer. Fertil. and Allied Chem.* 1950, **114**, 20-2.

A list is given of materials produced by manufacturers which are being offered for experimental work during the current season. A brief note is given of the characteristics of each of the materials and the address from whence they may be obtained. From *Herb. Abstr.*—P.J.B.

254 EWART, G. Y. **Use of aromatic solvents in aquatic weed and pest control.** *Agric. Engng, St. Joseph, Mich.* 1951, **32**, 157-8, 160, bibl. 5.

Aromatic solvents have been found to control aquatic weeds and pests in ditches in Hawaii. The solvent Socal No. 3, when used with emulsifiers Triton X-100 or G-1096, or with wetting agent Amine 20, proved very effective. Economic plants, cattle and sheep are not affected by it. Full details of concentrations used and methods of application are given.—C.W.S.H.

255 STURIALE, F. Diserbanti alla prova. [**Herbicides under trial.**] *G. Agric. Domen.* 1951, **61**, 220.

The influence of temperature, light, rain, wind and fog on the efficacy of selective herbicides is briefly described. Trials were carried out near Messina, Sicily, using 2,4-D and Agroxone on wheat, which was not affected by the herbicides. A table shows the resistance, or susceptibility, to the herbicides of the weed plants present in the field. The most susceptible species were: *Leucanthemum vulgare*, *Bellis perennis*, *Taraxacum officinale*, *Papaver rhoeas*, *Fumaria officinalis* and *Anagallis arvensis*.—E.B.

256 AUDUS, L. J. **The biological detoxication of hormone herbicides in soil.** *Plant and Soil* 1951, **3**, 170-92, bibl. 18. [Bedford Coll., Univ. London]

An account is given of experiments on the continuous perfusion of aerated solutions of the herbicides 2,4-D, MCPA and 2,4,5-T through garden soil. The test plant was *Lepidium sativum*. Results indicated that the kinetics of the breakdown of the three herbicides are essentially similar, three phases being distinguished. Indirect evidence of the development of a bacterial flora adapted to herbicide breakdown was supported by experiments in which detoxicating activity was destroyed by low concentrations of a bacterial poison. Attempts to isolate the organism decomposing the 2-4,D were successful. Cross perfusion experiments gave some indication of the capacity of soil enriched by one of the herbicides to detoxicate an analogue. From author's summary.—G.M.R.

257 MULLISON, W. R., and others. **Comparative herbicidal effectiveness of certain alkyl and glycol esters of 2,4-D and 2,4-5,T.** *Proc. 5th Northeastern Weed Control Conf.* 1951, 87-94, bibl. 3. [Dow Chem. Co.]

Laboratory trials showed that the polypropylene glycol butyl ether esters of 2,4-D and 2,4,5-T had a much lower volatility and were more herbicidally active than the corresponding isopropyl esters. In field trials, the herbicidal quality of the polypropylene ester of 2,4-D was compared to that of its isopropyl ester. Weed species used in the trials were golden rod (*Solidago* spp.), curly dock (*Rumex crispus*) and wild carrot (*Daucus carota*). Rates of application of the herbicides were 2, 4, 6 and 8 oz. per ac. At all equivalent rates of application the polypropylene ester of 2,4-D was more effective than the 2,4-D isopropyl esters. At the 8 oz. per ac. rate of application, the polypropylene ester gave almost complete kills of all the weed species.—P.J.B.

258 HEFER, S. **The use of 2,4-D in chemical weed control and its effect on plants.** *Proc. 1st South. Afr. Weed Control Conf. Frankenwald Fld Sta., Univ. Witwatersrand, Johannesburg, 1950.* 1951, 12-14. [Div. Chem. Serv., Pretoria]

259 MANITOBA Deparment of Agriculture and Immigration. Publ. No. 219 (revised). **Questions and answers on 2,4-D.** By *H. E. Wood* and others. 1950, pp. 16.

Summarized practical information on the use of 2,4-D is given, together with a list of weeds and woody species common to western Canada, classified according to their reaction to 2,4-D.—P.J.B.

260 BARRONS. K. C., and HUMMER, R. W. **Basic herbicidal studies with derivatives of TCA**. *Agric. Chem.* 1951, **6**, 48-50, 113-21, bibl. 12. [Dow Chem. Co., Midland, Mich.]

The results of tests support the view that the contact herbicidal effect of TCA appears to be physiologically distinct from the systemic response shown by TCA-susceptible plants. Tests to determine the mode of entry into plants of TCA showed that their foliage is, at best, an unimportant mode of entry, and that the roots constitute the most important avenue of entry. This fact indicates why the application of TCA to the upturned sod of ploughed *Agropyron repens*-infested soil has proved so effective. The application of oil solutions of TCA acid and esters to stems of Johnson grass (*Sorghum halepense*) caused growth inhibition, thought to be due to the systemic action of the oil in carrying the TCA through the plant tissues to the growing points. The fate of TCA in the soil and plant is discussed. It was noted that *Poa pratensis* was more easily killed when frequently mown, demonstrating the possibility that depletion of the carbohydrates reserves in plants by means of grazing, discing, or N fertilization may be of value in enhancing the action of TCA. A number of salts and esters of TCA with low vapour pressures were found to have a phytotoxicity equal to that of sodium TCA. Esters with high vapour pressures were of low phytotoxicity, owing to their high rate of volatilization. Crops were found to vary widely in their tolerance to TCA. A list is given of tolerant, intermediate and susceptible plants.—P.J.B.

261 KING, L. J., and KRAMER, J. A. **Studies on the herbicidal properties and volatility of some polyethylene and polypropylene glycol esters of 2,4-D and 2,4,5-T.** *Contr. Boyce Thompson Inst.* 1951, **16,** 267-78, bibl. 17.

This is a more detailed version of a paper presented at the Northeastern Weed Control Conference, 1951, for which see *Fld Crop Abstr.* 4:1154.—P.J.B.

262 GONGGRIJP, J. Het gebruik van minerale oliën voor bestrijding van onkruid. **The use of mineral oils for the control of weeds.** *Landbouwk. Tijdschr.* 1951, **63**, 103-16. bibl. 24, English summary p. 115. [Roy. Dutch Shell Lab., Amsterdam]

CROP BOTANY

263 WOLF, B. **Neglected plant food elements.** *Better Crops with Plant Food* 1951, **35**, 9-16.

Soil deficiencies of certain hitherto neglected trace elements have become increasingly apparent in USA soils. The types of soils on which particular deficiencies occur and the effect of lime, phosphates and arsenates on these deficiencies, are described. The following trace elements are reviewed in detail and recommendations are made for supplying them to soils: S, Ca, Mg, Fe, Mn, B, Cu, Zn and Mb.—P.J.B.

264 WEISSMAN, G. S. **Nitrogen metabolism of wheat seedlings as influenced by the ammonium : nitrate ratio and the hydrogen-ion concentration.** *Amer. J. Bot.* 1951, **38**, 162-74, bibl. 38. [College of S. Jersey, Rutgers Univ., Camden, New Jersey]

This study sought to determine how the utilization of one nitrogen source influences the utilization of the other, and how varying conditions of nitrogen supply and pH affect the nitrogenous composition of the plants. Seedling plants were used for the experiment because primary differences caused by ammonium or nitrate nutrition might be lost or obscured in mature plants. The seedlings were grown in the dark since plants exposed to light may use one type of nitrate assimilating mechanism in the roots and another type in the leaves. For ease of comparison in the various series, the concentrations are expressed as percentages of 0.01 M nitrogen. When ammonium or nitrate was present singly, its concentration ranged from 0-100%. When both ammonium and nitrate were present, the total concentration was held constant at 100% and the ammonium : nitrate ratios were varied from 0 : 100 to 100 : 0. Each culture was developed under small-volume (14 ml. per seedling) and large-volume (140 ml. per seedling) conditions at an initial pH of 4.3, 5.3 and 6.3. The results indicate that assimilation and protein synthesis are markedly influenced by the simultaneous presence of ammonium and nitrate nitrogen in the culture solution.—D.B.

265 SCHROPP, W. Stand der Forschung über das Spurenelement Bor. [**The position regarding research on the trace element boron.**] *Z. PflErnähr. Düng.* 1950, **51**, 127-39, bibl. 65. [Süddeutschen Versuchs-und Forschungsanstalt für Milchwirtschaft, Weihenstephan bei München, Germany]

A list of about 220 plant species for which boron has been demonstrated experimentally to be essential is presented together with the authority for each species name. The literature on the need for boron for germination of the pollen tube is summarized.—D.B.

266 SEMPIO, C. Contributo alla conoscenza del meccanismo della resistenza indotta dal Cd nei tessuti del frumento. Nota preventiva. [**A contribution to the knowledge of the mechanism of resistance induced by cadmium in wheat tissues. Preliminary note.**] *Ann. Fac. Agr. Univ. Perugia* 1942, **1**, 119-22, bibl. 2. [Received 1951]

The influence of cadmium on the resistance of two wheat varieties to *Oidium moniloides* was investigated.—E.B.

267 BUCHNER, A. Beitrag zur Frage der Chlorionenwirkung auf den Kohlenhydratstoffwechsel unserer Kulturpflanzen. [**The action of the chlorine ion on the carbohydrate metabolism of cultivated plants.**] *Z. PflErnähr. Düng.* 1951. **52**, 225-42, bibl. 34. [Tech. Hochsch. München, Weihenstephan, Freising, Germany]

The purpose of the investigation was to determine the action of chlorine-containing and chlorine-free nutrients on the mono-saccharose, di-saccharose and poly-saccharose content of plants. The experimental plants were *Beta vulgaris*, *Phaseolus vulgaris*, *Fagopyrum esculentum*, *Lupinus albus*, *Helianthus annuus*, *Hordeum sativum distichum*, *Triticum vulgare* and *Brassica napus* var. *oleifera*. The results, collected in 18 tables, show that the chlorine ion exerts a marked influence on the carbohydrate economy of the plants. It favours the production of the more highly polymerized carbohydrates at the expense of the reducing sugars, the total carbohydrate content being little changed.—D.B.

268 ŠESTAKOV, A. G., and NOZDRUNOVA, E. M. [**The effect on the phosphoric exchange and the yield of plants of withholding phosphorus for short spells from the nutritive solution during the initial growth period.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **78**, 335-8, bibl. 5. [Timirjazev Agric. Acad. Moscow]

Pot experiments were conducted in 1948/49 with wheat (*Triticum timopheevi*) and oats A-315 in water cultures, using Pfeffer's nutrient solution. The withholding of P during the initial period of plant growth led to a sharp reduction in the yield of grain. In addition, the weight of inorganic P was increased in the grain and in the whole plant, compared with the organic compounds of P. Only when the plants received P from the beginning of their growth did there occur a more active synthesis of organic P compounds capable of exerting a real influence on plant development and yield.—R.P.J.

269 ABOLINA, G. I. [**The importance of increased phosphoric nutrition of wheat while it is passing through the vernalization stage.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **79**, 161-4, bibl. 2.

Experiments conducted in the Department of Plant Physiology of the Karagandinsk Agricultural Experiment Station in 1948 and 1949 and field trials of the Selection Department in 1950 are reported. It was found in spring and winter wheat that when the seeds pass through the vernalization stage in phosphoric acid salts certain qualitative changes are occasioned in the growing points which cause acceleration in the development of the plants and the earlier initiation of the development phases. The plants also have a larger number of grains per ear and the grains are better filled, so that the yield is increased.—R.P.J.

270 SMITH, F. E. **Tetrazolium salt.** *Science* 1951, **113**, 751-4, bibl. 59. [Pal Chem. Ltd., London]

A summary is given of work done on the use of 2,3,5-triphenyl tetrazolium chloride for determinations of seed viability and for the study of other active cell processes.—P.J.B.

271 CAVANILLAS, L. Experiencias en lisímetros. [**Lysimeter trials.**] *Bol. Inst. Invest. agron.* 1951, **11**, 211-21, bibl. 6, English and French summaries p. 220.

The water requirements of irrigated crops, such as wheat and maize, are being studied in Spain by means of lysimeters. The errors which can be made in these studies are explained and appropriate methods of work are described for reducing such errors.—E.B.

272 OZBEK, N. [**The water requirements of some important food plants cultivated in Turkey.**] [Turkish] *Ankara Univ. Fac. Agric.* Publ. No. 8, 1949, pp. 112. [Received 1951]

273 CRAFTS, A. S. **Movement of assimilates, viruses, growth regulators, and chemical indicators in plants.** *Bot. Rev.* 1951, **17**, 203-84, bibl. 163. [Univ. Calif., Davis]

The literature on the subject, which is of general botanical interest, is reviewed under the following chapter headings: structure and function of the phloem; phloem exudation and normal transport; transport of assimilates; virus movements in plants; fluorescein; radioactive elements; and hormones, vitamins and growth regulators. From *Herb. Abstr.*—D.B.

274 HOROWITZ, B. **Alkaloid production in plants and its significance to pharmacology and agriculture.** *Aust. J. Sci.* 1951, **13**, 143.

The location of the organs in which alkaloids are found has been determined by the approach-graft technique, in which an alkaloid-producing and a non-alkaloidal plant are combined. This method has shown that the root is the organ in which alkaloids of a large number of the Solanaceae are formed. Feeding experiments on detached organs have shown that some amino-acids, or sulphate of ammonia with sucrose, act as precursors of certain alkaloids. Environmental factors which increase the alkaloid content and yield are indicated. The possibility of introducing some 'poisonous' plants into cultivation for human or animal consumption as a result of decreasing the amount of their 'poisonous' element is being investigated.—A.G.G.H.

275 FIEDLER, J. Anatomická variabilita a její využití pro šlechtění plodin. [**Anatomic variability and its utilization for the selection of plants.**] *Sborn. čsl. Akad. Zeměd.* 1950, **23**, 181-5, Russian and English summaries p. 185. [Czechoslovakia]

The investigation was made with wheat and barley varieties to determine whether the number of veins in cereal leaves is related to grain yield. By totalling the number of veins on the first leaf of the cereal (100 grains were sown of each strain) and by calculating the average number of veins per leaf, a figure is obtained which is characteristic for the strain in question.—M.H.

276 JONES, M. D., and BROWN, J. G. **Pollination cycles of some grasses in Oklahoma.** *Agron. J.* 1951, **43**, 218-22, bibl. 4. [Oklahoma Agric. Expt Sta.]

The studies reported were carried out at Stillwater, Oklahoma. The time of day and number of days during which *Zea mays*, Balbo rye (*Secale cereale*) and *Sorghum vulgare* shed their pollen was determined.—P.J.B.

277 HENKELJ, P. A., and MARGOLINA, K. P. [**Viscosity of protoplasm and the heat resistance of vegetative and reproductive organs of plants.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **76**, 587-90, bibl. 8. [Timirjazev Inst. Plant Physiol., Acad. Sci. USSR]

[See also *Fld Crop Abstr.* 2 : 1442] Tabulated data are given for plants which include wheat, rye and sunflower, among others.—M.H.

278 Gobis, Livia. Sul significato biologico dell'acido citrico. Correlazioni tra contenuto in acido citrico e metabolismo protidico nei semi. [**The biological significance of citric acid. Correlations between the citric acid content and the protein metabolism in seeds.**] *Ann. Sper. agr.* 1951, **5**, 571-6, bibl. 9, English summary pp. 575-6. [Sta. Sper. del Freddo, Milano, Italy]

An account is given of a preliminary investigation into the relation between citric acid and N metabolism in dormant seeds and germinating seeds of some species of Gramineae and Leguminosae. The citric acid content was found to be considerably higher in the seeds of the Leguminosae than in the seeds of the Gramineae. There appeared to be a direct relation between the N content and the citric acid content in these seeds. In the first stages of seed germination, before the photosynthetic activity starts, the citric acid content decreases. It therefore seems that citric acid forms when the proteins are synthesized and decreases when there is demolition of proteins. The value of the nitrogen to citric acid ratio is about 9 in the dormant seeds of Gramineae and about 3 in the dormant seeds of Leguminosae. In the case of germinating seeds, this ratio is about 20 to 27 in the Gramineae and about 7 to 9 in the Leguminosae.—E.B.

279 Hemberg, T. **Rooting experiments with hypocotyls of *Phaseolus vulgaris* L.** *Physiol. Plant.* 1951, **4**, 358-69, bibl. 16. [Inst. Plant Physiol. Univ. Stockholm]

Cut plants of *Phaseolus vulgaris* with two developed leaves and removed cotyledons can form roots on their hypocotyls when placed in tap water or in extracts of dry leaves in distilled water, but fail to do so when placed in nutrient solutions containing K, Ca, Mg, phosphate, sulphate and nitrate, or in distilled water. When boric acid is added in small concentrations to the nutrient solutions, or to the distilled water, roots are formed. The content of free auxin and that of bound auxin was determined in hypocotyls freshly cut from intact plants, or from cut plants kept in tap water for varying periods, in order to form roots. The increase in the content of free auxin is inconsiderable during the first four to five days after cutting off the hypocotyls. There is a fairly large increase in the content of bound auxin during that time. Later, the amount of free auxin increases. The increase in the amount of bound auxin in the hypocotyls during rooting may be due to an increase in the amount of auxin precursors from which the bound auxin is formed during the extraction, or to an increase in the concentration of the enzymes that liberate auxin from the auxin precursors.—R.P.J.

280 Dormer, K. J. **A quantitative study of shoot development in *Vicia faba*. III. The dry weights of the plumular internodes.** *Ann. Bot., Lond.* 1951, **15**, 290-303, bibl. 3. [Univ. Manchester]

The development of the bean shoot has been studied by cutting a piece of each internode and determining the dry weight per unit stem length, the 'linear density' of the internode. The measurements of this quantity are used in the mathematical analysis of physiological age. It is shown that there is a drastic reduction in relative growth rate of the stem during the unfolding of the 9th leaf and that there is evidence of an unknown factor affecting many of the shoot-growth processes with a maximum intensity in the 5th internode. The bearing of these facts on the conception of the plastochrone as a unit of shoot growth is discussed.—Author's summary.

281 Ferri, Mario G. Riboflavina e fototropismo des articulações das folhas de feijão. [**Riboflavin and phototropism of the joints of bean leaves.**] *Ciencia e cultura* **2**, 206-9.

Both riboflavin and auxin occur normally under natural conditions in the pulvini and petioles of leaves of bean plants (*Phaseolus vulgaris* L. var. *sub-compressus* Alef.). It is suggested that the theory that the base response of *Avena* coleoptiles to light is probably due to a riboflavin-sensitised auxin destruction may also be applicable to the phototropic reactions of the pulvini of the leaves of bean plants.—From author's summary.

282 Bennett, E. **The sugars of the hemicelluloses of cornstalks.** *Plant Physiol.* 1951, **26**, 182-85, bibl. 4. [Univ. Massachusetts, Amherst]

Four hemicellulose fractions previously extracted from holocellulose of maize stalks by means of solvents of increasing strength were hydrolyzed. Arabinose, xylose, glucose, and galactose were detected in all fractions. The sugars were determined quantitatively by paper chromatographic procedures. The ratios of the sugars were variable, but in general the content of xylose increased in the fractions most difficult to extract. The presence of the pentose sugars is discussed.—Author's summary.

283 Ždanova, L. P. [**Comparative analysis of photoperiodic induction in short- and long-day plants.**] [Russian] *Trudy Inst. Fiziol. Rast. im. K. A. Timirjazeva* 1948, **6**, 69-84, bibl. 34. [Received 1951] [Timirjazev Inst. Plant Physiol., Acad. Sci. USSR]

From investigations of photoperiodic induction, it appears that in the majority of long-day plants the induction period is much longer than in short-day plants. In the opinion of some authors this supports the view that long-day plants are less sensitive to photoperiod than are short-day plants. In the absence of direct evidence on this point, the author has carried out experiments with the following short-day plants: *Panicum mileiaceum* var. *rubrum*, *Cosmos sulphureus*, and *Perilla nankinensis*, together with the long-day plants *Avena sativa*, *Anethum graveolens*, *Lactuca sativa* and *Rudbeckia bicolor*; and also *Polygonum fagopyrum* and *Zea mays*, which are neutral in regard to their photoperiodic reaction. In a detailed discussion of the many factors involved it is noted that the concept " length of the induction period " entails consideration of (1) the minimal number of days of photoperiodic action required by the plant for its transition from vegetative growth to reproductive development and subsequent stages; and (2) the duration of induction which will ensure a specific rate of reproductive development during the time the plant is subjected to a favourable photoperiod. These two aspects are considered in relation to plants belonging to the long-day and short-day groups.—M.H.

284 LEWICKI, S. Studia nad jarowizacją roślin. 2. **Studies on vernalization of plants. 2.** *Ann. Univ. M.C.-S.* 1950, **5**, 204-20, English summary pp. 219-20. [Lublin, Poland]

The author reports details of comparative field experiments on the productive values of vernalized and non-vernalized cereals, using spring varieties of wheat, oats and barley. It is emphasized that errors due to technique may be attributed to the fact that no means were available to determine the optimum thermic limits for the species examined.—M.H.

285 KELLY, Sally, and AVERY, G. S., Jr. **The age of pea tissue and other factors influencing the respiratory response to 2,4-dichlorophenoxyacetic acid and dinitro compounds.** *Amer. J. Bot.* 1951, **38**, 1-5, bibl. 13. [Vassar Coll., Poughkeepsie, New York, and Brooklyn Bot. Gdn, Brooklyn 25, New York]

In concentrations of 0.01-10.0 mg./l., 2,4-D is found to stimulate respiration of rapidly growing stem tissue of Alaska pea. Maximum stimulation occurs at a concentration of 0.1 mg./l., and is 35% over the control. At 100 mg./l. respiration is inhibited. Respiration of older pea stem tissue that has ceased to elongate is relatively unaffected by 2,4-D except at concentrations of 0.1 mg./l., and above, which is inhibitory. Greater stimulation of respiration by 2,4-D is brought about in starved than in unstarved pea stem tissue. Pea stem tissue is affected by 2,4-dinitro-o-cyclohexylphenol (DNP) in the same concentrations that *Avena* coleoptile tissue is, and to the same extent, i.e., stimulated at 1 mg./l. and inhibited at 4 mg./l. Pea tissue respiration is not affected by 2,4-dinitro-o-cresol (DNC) except at concentrations of 1 mg./l. and higher, which are inhibitory. Respiratory responses of pea stem tissue to DNP are affected by the relative proportion of freshly cut tissue surface, whereas the responses to 2,4-D are independent of cut surface exposed, indicating a difference in penetration behaviour of the two compounds.—Authors' summary.

286 BADENHUIZEN, N. P. **Plant growth-regulators—an introduction.** *Proc. 1st South. Afr. Weed Control Conf. Frankenwald Fld Sta., Univ. Witwatersrand, Johannesburg, 1950.* 1951, pp. 7-11, bibl. 35.

The author draws attention to the work done on the biochemical aspect of plant growth regulators. A brief description is given of the nature of hormones and auxins, their influence on respiration and enzymes, and their general effect on plant growth. Reference is made to the application of hormones in weed control, their lethal action, selectivity and persistence in the plant, and to the activity and structure of hormone weed killers, particularly of 2,4-D.—K.L.

287 OSBORNE, D. J., and WAIN, R. L. **Plant growth-regulating activity in certain aryloxyalkylcarboxylic acids.** *Science* 1951, **114**, 92-3, bibl. 8. [Wye Coll., Ashford, Kent, England]

A brief report is given of tests with a number of classes of aryloxyalkylcarboxylic acids.—P.J.B.

288 SHOJI, K., and others. **Auxin in relation to leaf blade abscission.** *Plant Physiol.* 1951, **26**, 189-91, bibl. [Coll. Agric., Univ. Calif., Los Angeles, 24]

Black Valentine bean was the experimental material used. The graph of auxin content and age of plant shows that, during the period of normal functioning of the leaf, the auxin concentration in the blade of the leaf is approximately three times that in the leaf stalk. As the leaf becomes yellow and approaches the stage of abscission the auxin concentration in the leaf falls to the level of that in the leaf stalk. There is thus, during the period of activity of the leaf, an auxin gradient across the abscission zone. It is the loss of this gradient, rather than the absolute amount of auxin, which controls abscission. From *Herb. Abstr.*—D.B.

289 LEOPOLD, A. C., and KLEIN, W. H. **Maleic hydrazide as an antiauxin in plants.** *Science* 1951, **14**, 9-10, bibl. 10. [Hort. Dept, Purdue Univ., Lafayette, Ind.]

In experiments using the standard slit-pea test, growth-inhibitory levels of maleic hydrazide were added to increasing concentrations of auxin. Maleic hydrazide inhibited growth in the presence of low concentrations (0.01 and 0.1 mg./l. indole acetic acid), but not high concentrations (10 and 100 mg./l.) of auxin. The capacity of auxin to overcome the growth inhibition of maleic hydrazide was reproducible over a wide range of maleic hydrazide concentrations, and was confirmed by the pea and *Avena* straight-growth tests. From *Herb. Abstr.*—P.J.B.

290 ALMESTRAND, A. **The effects of pyridoxine on the growth of isolated grass roots.** *Physiol. Plant.* 1951, **4**, 224-41, bibl. 20. [Bot. Lab., Lund]

The effects of pyridoxine and two related compounds, pyridoxamin and pyridoxal, on the growth in sterile liquid media of isolated roots of 9 strains of wheat, 6 of barley, 9 of oats and 1 of rye were studied. The growth of the 9 wheat strains was generally accelerated by the addition of pyridoxine, but in varying degrees. Pyridoxine had no growth-promoting effect on the strains of barley, oats and rye investigated. To determine the effect of pyridoxine on metabolism two strains of wheat were studied, the pyridoxine-sensitive Eroica and the pyridoxine-insensitive Virtus. The latter showed very slight differences both in glucose absorption and absorption of ions with different vitamin combinations as well as with varying pyridoxine concentrations. In Eroica wheat the deviations were more significant. This is in agreement with the growth results. The increase in weight of wheat roots was mainly due to an accumulation of glucose. Comparative studies of barley and oats showed that their roots had a smaller glucose absorption than wheat roots. The pyridoxine derivatives pyridoxamin and pyridoxal had about the same growth-promoting effects as the mother substance.—From author's summary.

291 FERRI, G., and CAMARGO, Lucia V. de. **Influence of growth substances on the movement of the pulvini of the primary leaves of bean plants.** *Anais de Acad. Brasiliera de Cienc.* 1950, **22**, 161-70.

The junctions of the petioles and the stems of 2 to 5 weeks old bean plants (*Phaseolus vulgaris*) were cut so as to form Y-shaped sections. The angle between the petioles varied with the movements of the pulvini. When sections were immersed in water, the angle increased; when immersed in IAA (indoleacetic acid) it decreased. The auxin-induced movement is of a specific nature, and is not due to either osmosis or pH. Thus, a new method for detecting the presence of growth substances in solution is presented. Galston's finding, that riboflavin inactivates IAA in the presence of light, was confirmed.—N.G.S.

292 FERRI, M. G. Foto-destruição do fitohormônio acido indolil-3-acético por compostos fluorescentes. [**Photo destruction of the phyto-hormone indole-3-acetic acid by fluorescent substances.**] *Botanica* 1951, No. 8, 45, bibl. 41.

It is held that the inactivation of IAA (indole-3-acetic acid) by riboflavin, eosin, and other fluorescent substances, such as quinine sulphate, aesculin, and 2,3,5-triphenyl tetrazolium chloride, in the presence of light is due to a reaction of a photochemical nature, being catalysed non-specifically by fluorescent substances. This reaction appears to be an oxidation reaction. Air oxygen is essential for the riboflavin reaction, but inhibits the quinine sulphate reaction. As IAA is destroyed, the fluorescence of IAA-quinine sulphate solution decreases.—From author's summary.

MISCELLANEOUS

293 McGEE, J. H. **The organization of an abstracting service.** *Spec. Libr.* 1949, **40**, 244-8. [Received 1951]

An abstract journal helps the reader to keep abreast of current developments and provides the research worker with a source of references. The main essentials in running an abstracting service are dealt with in this article and include: subject coverage, abstracting techniques, bibliographic form and the compilation of author and subject indexes. The value of furnishing subject indexes with each issue and cumulating them frequently is stressed as the ideal.—C.L.S.

294 UNITED NATIONS Educational, Scientific and Cultural Organization. **List of scientific papers published in Latin America, 1949. 2.** pp. 552, Montevideo; UNESCO Cent. de Coop. Cientifica Para America Latina, 1949, 34 × 23.

Those scientific agricultural articles published in South America in 1949 and communicated to the UNESCO Centro de Cooperacion Cientifica para America Latina are listed on pp. 122-59.—N.G.S.

295 INDONESIA, Organization for Scientific Research, Djakarta. Bull. No. 10. 2nd edi-

tion. **Guide to scientists in Indonesia.** 1951, pp. 28.

This useful bulletin also serves as a guide to scientific institutions in Indonesia.—A.G.G.H.

296 UNITED STATES Department of Agriculture. Bibl. Bull. 14. **A bibliography of plant pathology in the tropics and Latin America.** By *Helen V. Barnes* and *Jessie M. Allen.* 1951, pp. 78.

This gives 2395 references arranged in alphabetical order by authors and includes an index of plant diseases.—N.G.S.

297 CAMBRIDGE, National Institute of Agricultural Botany. **Guide to varieties of field and vegetable crops under trial, observation and propagation 1951.** 1951, pp. 65.

298 UNITED STATES and CANADA, International Crop Improvement Association. Publ. No. 17. **Minimum seed certification standards.** 1950, pp. 71.

299 INDIA, Council of Agricultural Research. **List of common names of Indian plant diseases.** *Indian J. Agric. Sci.* 1951, **20**, 107-42.

This list gives the Latin names and their English equivalents (based largely on the List of Common Names of British Plant Diseases, published in 1934) for the diseases affecting some 279 host plants, which include field crops, fruit trees and forest trees.—N.G.S.

300 MAAN, W. J. Plantenziektenbestrijding met behulp van vliegtuigen. [**Controlling plant disease with the aid of aeroplanes.**] *Maandbl. LandbVoorlDnst* 1951, **8**, 104-12. [Inst. Phytopathol. Res., Amstelveen, Netherlands]

A general discussion of the subject is presented, together with a short account of experiments in the Netherlands. The cost of using a helicopter is greater than that of an ordinary aeroplane, but the helicopter does better work. With skilful management, the cost of spraying or dusting from the air should be considerably less than that of using land machines which are propelled through crops. An additional advantage is that there is no mechanical injury to the plants.—G.M.R.

301 DAVID, W. A. L. **Insecticidal-action studies with bisdimethylaminophosphonous anhydride containing ^{32}phosphorus.** *Ann. appl. Biol.* 1951, **38**, 508-24, bibl. 14. [Agric. Res. Counc. Unit of Insect Physiol., Univ. Cambridge]

Bisdimethylaminophosphonous anhydride containing ^{32}P was absorbed by the roots of broad beans placed in culture solutions containing it. The level of radio-activity in the plant increased as the solution was absorbed and was higher in the washed roots than in the rest of the plant. The activity of the remaining culture solution increased as more was absorbed showing that the roots selectively rejected the radio-anhydride. The material was absorbed more slowly from soil than from sand. In both cases the concentration per gram of tissue was highest in the leaves on the middle part of the stem. About 50% of the radio-anhydride was decomposed within the plant in 8 days. The concentration of undecomposed anhydride in the plant necessary to kill *Aphis fabae* was about 50 mg./kg. of beans. No measurable quantity of radioactive material was transpired by plants taking up the radio-anhydride by the roots. Radioactive material was detected within the broad bean leaf a few hours after it had been applied to the leaf surface. In all plants there was evidence that radioactive material was translocated to untreated parts. Much more was translocated to leaves younger than those treated. —From author's summary.

302 LOGOTHIS, C. Pruebas preliminares del control de la langosta con Aldrin. [**Preliminary experiments on the control of locusts by Aldrin.**] *Suelo Tico* 1950, **4**, 382-92.

Preliminary experiments were carried out at Managua, Nicaragua, on the control of the locust *Schistocerca paranensis* with Aldrin. The locusts were in the 4th to adult stages of development. Aldrin was applied at rates of 3-8 oz. per acre, and even the lowest rate gave a high degree of control after 2-3 days. These rates were higher than those recommended by the manufacturer (2 oz.).—N.G.S.

303 HEM SINGH PRUTHI and MOHAN SINGH. **Pests of stored grain and their control.** *Indian J. agric. Sci.* 1951, **28**, pp. 88, bibl. 250, illus. [Received 1951]

The more important pests of stored grain in India are described and illustrated. Infestation increases rapidly with rises in humidity, and grain intended for long storage should have a moisture content of less than 8%. The four major sources of infestation are: eggs laid on the grain in the field; insects remaining in store from the previous crop; insects in bags; and transport equipment. The signs indicating the presence of insects in a store are outlined. Local stores and storage methods are described. Cement concrete khattis are recommended as the best type of store. Different types of preservatives are considered, as is also the practice of screening grain. Remedial measures include fumigation (brief notes are given on different fumigants), the use of insecticides (DDT and BHC), superheating, refrigeration, vacuum drying, trapping, sticky-banding, and the use of emulsions. Methods of controlling termites and rats are mentioned.—N.G.S.

304 ENGLAND and WALES, Ministry of Agriculture and Fisheries. Leafl. No. 10. **Fixed equipment of the farm. Design of farm grain stores.** 1951, pp. 23, illus.

305 WALLACE, T. **The mineral nutrition of crops. Some recent developments in research.** *N.A.A.S. Quart. Rev.* 1951, No. 11, 93-102, bibl. 54. [Long Ashton Res. Sta., Bristol]

A review of past and present research.—K.L.

306 BERGE, H. Das Pflanzenwachstum auf stark-sauren Böden unter dem Einfluss steigender Nährstoffgaben. [**Plant growth on strongly acid soils under the influence of increasing amounts of nutrients.**] *Z. Pfl-Ernähr.Düng.* 1950, **51**, 108-27, bibl. 16. [Agrichem. Lab., Heiligenhaus, Bez. Düsseldorf]

As a result of a shortage of lime and fertilizers during the war years there has been an increase, both in degree and in extent, of soil acidity in many parts of Germany. Investigations into the fundamental causes of damage to crops by acid soils were therefore undertaken. It was evident from these investigations that there exist three groups of acid-sensitive plants. (1) Crops such as barley and wheat suffer on acid soil because of the presence of free aluminium ions. Damage from this cause can be remedied by an increased application of phosphate which fixes the free aluminium as insoluble aluminium phosphate. Since soil nitrification decreases with increased soil acidity additional nitrogen and potassium fertilizers in amounts corresponding with the degree of acidity, are also required. (2) Plants of the second group, e.g. the oil crops rape and poppy, suffer from an increase in hydrogen ion concentration in the soil. Additional applications of lime provide the only remedy for obtaining satisfactory growth for this group of plants. However, even for these plants, increased applications of NPK can be of some use. (3) Plants of the third group, to which the Leguminosae belong, suffer indirectly through a lower activity of nodule bacteria. The crop can be helped to better growth by increased applications of complete fertilizer. The author makes it clear that lime is the basic remedy for acid soils, but that when this is not available in sufficient quantities yields can be maintained by using the temporary measures outlined above.—D.B.

307 SWEDEN, Kungl. Lantbrukshögskolan och Statens Lantbruksförsök Statens Jordbruksförsök. Medd. No. 30. Den lokala gödslingsförsöksverksamheten. Sammanställningar av försöksresultat under åren 1921-1940. 2. Sydsvenska höglandet. [**Local fertilizing experiments. Coordination of the experimental results obtained in 1921-1940. 2. Highlands of southern Sweden.**] By *C. Larson.* 1950, pp. 268, English summary pp. 265-7.

Summarized results are given of extensive manurial trials in 3 agricultural areas of Sweden, comprising the southwest and northeast regions of the south Swedish uplands and the coastal region of Götaland, on clay and clay-free mineral soils and on soils of organic origin. In the trials, different amounts of N, P and K were applied to winter wheat, winter rye, spring wheat, barley, oats, oats-barley mixtures, sugar-beet, mangolds, swedes and turnips. Climatic data for the period of the trials and descriptions of the geography, geology, soils, soil pH and agricultural practices of the regions are given. In all the regions, the mineral soils are deficient in N and P and the clay-free soils are also deficient in K, while the soils of organic origin are markedly deficient in P and K.—P.J.B.

308 KASERER, H. Die Wirkungsweise der Keimlingsdüngung mit "Porro". Eine grundsätzliche Erörterung. [**The mode of action of seedling manuring with "Porro". A fundamental discussion.**] *Bodenkultur* 1950, **4**, 70-7, bibl. 4.

The increased efficiency of plants grown from Porro-dusted seed has been discussed in detail and has been attributed to the more ready swelling of healthy seeds, the neutralizing of unfavourable soil reactions, the killing of unhealthy seeds, the activation of dormant seeds, and to changes in the protoplasm which gave rise to a better water economy and stronger root growth. The conditions under which this increased plant efficiency can lead to higher yields has been discussed and substantiated.—Author's summary.

REVIEWS AND REPORTS

REVIEWS

309 Norman, A. G. (Ed.). **Advances in agronomy.** Vol. 1., pp. xii + 439, New York; Academic Press Inc., 1949, 24 × 16, £3. 8s. 0d.

The editor of this publication in his preface maintains that the objective of the work is to survey and review progress in agronomic research and practice. The central theme of the 10 sections of the book is that of soil-crop relationships. The publishing plans of other organizations have been watched in order to avoid duplication. For example, research on pastures has not been reviewed in this work because this subject was dealt with in the USA Yearbook of Agriculture, 1948. While the survey incorporates material published over a period of 100 years or more, it should be recorded that the work reviewed is primarily that of North American agronomy. Apart from 5 chapters which are of interest primarily to the soil scientist, the chapters on (1) plant growth on saline and alkali soils (by H. E. Hayward and C. H. Wadleigh, US Regional Salinity and Rubidoux Labs, Riverside, Calif.), (2) soyabeans (by M. G. Weiss, Iowa State Coll., Ames), (3) alfalfa improvement (by W. J. White, Domn Forage Crops Lab., Univ. Saskatchewan, Saskatoon, Canada), and (4) weed control (by A. S. Crafts and W. A. Harvey, Univ. California, Davis) are of particular interest to readers of this journal. The work contains a short subject index and an author index in which distinction is made between references to authors cited in the text and to those listed in the bibliographies which are appended to each chapter.—M. Hall.

310 Norman, A. G. (Ed.). **Advances in agronomy.** Vol. 2., pp. xi + 407, New York; Academic Press Inc., 1950, 24 × 16, £3. 8s. 0d.

The second volume in this series conforms in objective and pattern to the first issue, and the agricultural bias expressed is again predominantly American. In this review consideration is limited to five chapters, namely, those on cotton, Ladino clover, the preservation and storage of forage crops, the reclamation of coal mine spoils, and irrigated pastures.

Cotton. This section has been written by several authors and co-ordinated by J. E. Adams, of the Texas A. and M. College System, College Station, Tex. Among the subjects reviewed are: the competitive position of cotton among fibres; the physiology of the cotton plant; and improvements in production practices.

Ladino clover. This section is written by G. H. Ahlgren and R. F. Fuellerman, of Rutgers Univ., New Brunswick, N.J., and Univ. Illinois, Urbana, respectively. The species is given as *Trifolium repens* var., but doubt is expressed regarding the nomenclature. [This Bureau suggests that the note appearing in the *Journal of the British Grassland Society*, Vol. 3, No. 3, pp. 209-10, 1948, might assist in this connexion.] Following a brief discussion of the history and distribution of the crop, information is given on characteristics and adaptation, establishment and management, and utilization.

Preservation and storage of forage crops. This chapter, by R. B. Musgrave and W. K. Kennedy, of Cornell Univ., Ithaca, N.Y., is concerned with works on silage and the different methods of curing and drying hay, with special reference to the comparative losses sustained under the different methods of preservation.

The reclamation of coal mine spoils. This review is by H. Kohnke, of Purdue Univ., Lafayette, Indiana. The use of pastures in revegetating unlevelled and graded spoil areas is included in this detailed survey which is divided into ten sections and covers 32 pages.

Irrigated pastures. This section is reviewed by W. Keller and M. L. Peterson, of US Dept Agric., Logan, Utah, and California Agric. Expt Sta., Davis, respectively. The subject is discussed in 7 sections which include: the choosing of productive mixtures; establishment and management of pastures; economy of pastures; and pastures in relation to other sources of feed.

The editor, Advisory Board and publishers of this useful series, *Advances in Agronomy*, are to be congratulated on its production.—M. Hall.

311 Hunter, H. **Crop varieties. Varieties of cereals, flax, potatoes, beans and field peas.** pp. xiii + 224, London; Farmer and Stockbreeder Publications, Ltd., E. and F. N. Spon Ltd., 1951, 22 × 14, 21s.

The author explains in his preface that the aim of the book is to present the existing position of varieties of certain crops in their relation to agricultural demands, and to indicate the extent to which these varieties meet commercial requirements. Following an introduction, in which there is a discussion of the history and practice of plant selection and crop improvement, three chapters are devoted respectively to barley, wheat and oats. The investigations on malting barley are described in some detail because work on this crop illustrates the stages in crop improvement which, in general, are applicable also to wheat and oats. The chapters on these three cereals contain bibliographies and also appendices giving notes on the classification and characteristics of named varieties. Chapters 5 to 9 deal with: rye, field beans and field peas, flax, pure seed and schemes of cereal seed certification, and potatoes. Because of the special importance of cereal seed certification, attention may be drawn to the scheme which is described as peculiar to Ireland "in so far as the greater part of barley seed there is supplied to farmers through maltsters, and the very remarkable extent to which efforts to confine the production of barley in that country to one variety have been successful. The scheme in operation is unique, moreover, in so far as all stocks are examined in the matter of trueness to name and freedom from seed-borne diseases by an expert staff employed by Messrs. A. Guinness and Co., the largest users of Irish malting barley. To the high quality and uniformity of the seed thus made available to barley growers, much of the success of the Irish crop as it exists to-day is rightly attributed. But in addition to the examination of stocks when they have reached the commercial stage and the attendant advantage thereof, nucleus stocks are continually being made available from the Irish Department of Agriculture's Cereal Station. These, while in course of development, are under the close supervision of the Department's seed officers, and, if satisfactory, are finally developed as commercial stock as circumstances demand." An outline is given of the inspection measures which operate in England and Wales, the Danish Control Scheme for Cereal Seeds, and the Seed Oat Certification Scheme in Northern Ireland which follows the lines of the scheme in Denmark.—M. Hall.

312 MERCER, W. B. **British farming.** pp. 96, London; H.M. Stationery Office, 1951, 23 × 18, 3s. 6d.

This well-illustrated and very readable account of the many branches of farming practised in England, Scotland, Wales and Northern Ireland is written by the Provincial Director of the West Midland Province of the National Agricultural Advisory Service, in collaboration with eight others, each an authority in a particular sphere. The result is an nteresting, concise and authoritative booklet, which briefly covers: the history of the industry, dairying, beef and sheep, pigs and poultry, arable arming, the ploughlands of Scotland, market gardening, and mixed farming in Northern Ireland. The many illustrations are excellent, but the captions of some of them are facetious and so out of keeping with the text. The booklet concludes by reminding us that the outstanding mark of our imes is the pace both of change and of daily work. Thus the ploughman no longer ploughs his cre and plods wearily home at close of day; intead he ploughs four or five acres and goes home in top gear. We recommend this publication to all those in search of a short, authoritative work, which will give them a grasp of the essentials of farming as practised in these islands to-day, as well as a glimpse of the past.—A. G. G. Hill.

313 WADHAM, S. M., and WOOD, G. L. **Land utilisation in Australia.** pp. 369, illus., Melbourne; Melbourne University Press, 1950, 25 × 16, 30s.

The original 1939 edition, reviewed in *Herb. Abstr.* 10 : 544 has been revised and brought up to date to 1947. Much of the material has been rewritten, additional figures and photographs have been included (although the vegetation map has been omitted), and a chapter on the effects of World War II on Australian farming has been added. The value of this already excellent work has now been further enhanced. It should be read by all those interested in Australian agricultural and economic development.—N. G. Shreeve.

314 COMMONWEALTH BUREAU OF PASTURES AND FIELD CROPS. **Management and conservation of vegetation in Africa. A symposium.** Bull. 41, pp. 97, illus., Edinburgh; Commonwealth Agricultural Bureaux, Farnham Royal, Bucks, England, 1951, 25 × 19, 10s. 6d.

This symposium by scientists working in the British Commonwealth countries of Africa makes it clear that, if serious, periodic food shortages are to be avoided, soil conservation through the proper management of the vegetation cover is a major necessity. Shifting cultivation and the misuse of fire are becoming more alarming as the human population increases, so that the introduction of improved agricultural practices is an imperative need if the well-being of the peoples of Africa is to be safeguarded. The treatment of the subject is more from the standpoint of vegetation surveys and the mapping and description of the different broad types of vegetal cover, rather than land management. This approach illustrates the need in Africa for intensive vegetation surveys using a common technique and terminology.—A. G. G. Hill.

315 BELGIUM, Institut National Étude Agronomique Congo Belge. Flore du Congo belge et du Ruanda-Urundi. Spermatophytes. [**Flora of the Belgian Congo and Ruanda-Urundi. Spermatophytes.**] Vol. 2, pp. 609, illus., Bruxelles; Vromant, S.A., 1951, 26 × 17, 500 fr.

[See *Fld Crop Abstr.* 4 : 582] The second volume of this work deals with 25 families of dicotyledonous angiosperms, among which are the Chenopodiaceae and the Cruciferae. Each chapter includes descriptions of the family, genera and species and keys to the identification of subordinate groups, with notes on distribution, habitat, etc. Among the 10 genera of Cruciferae, is *Brassica*, with *B. oleracea* and *B. juncea*. There are indexes of scientific terms and of vernacular names.—E. Biasutti.

316 Finan, J. J. **Maize in the great herbals.** pp. xiv + 149-191, fig. 25, Waltham, Mass; The Chronica Botanica Co., London; Wm. Dawson and Sons Ltd., 1950, 26 × 18, $3.00.

The great scope of this work may be indicated by an analysis of the contents page. The publication is in two parts: A. maize in post-conquest Hispanic America, which includes descriptions of maize by Spanish chroniclers and an account of the uses of maize by natives of the New World; and B. maize in the great herbals of Europe (Germany, Low Countries, Italy, Spain, Switzerland and England). There are also tables indicating the place of origin of maize according to the herbals, the kernel colours of maize described by the herbalists, and descriptions of original woodcuts. Two appendices include, (1) information on the historical background of woodcuts and the use of woodcuts for botanical illustration; and (2) passages from the original early texts, quoted and translated. There are two general types of maize discussed in the herbals. The first is similar to the typical flints of eastern North America, and the second resembles the present-day maize of the Caribbean area.—M. Hall.

317 King, F. C. **The weed problem—a new approach.** pp. xii + 164, London; Faber and Faber Ltd., 1951, 20 × 13, 8s. 6d.

Hidden beneath this promising title may, perhaps, lie the seeds of fresh knowledge, but it would be a patient seeker indeed who could find them. The author, whilst championing weeds and advocating a new approach to them, fails to substantiate his claims in a scientific manner and his arguments and conclusions do not bear close scrutiny. After eulogizing weeds, a chapter is devoted to methods of controlling them. Digging is alleged to propagate more weeds than it destroys, and mulching undug soil with compost or sawdust is recommended in place of digging. Unfortunately, one of the chosen methods of weed control, using sawdust, also resulted in crop failure. The author is simultaneously depressed by the presence of weeds and by their absence and considers, on balance, that fewer but better weeds should be the gardener's aim. This is not a book that can be recommended to the scientist.—N. G. Shreeve.

318 England and Wales, Ministry of Agriculture and Fisheries. Bull. No. 36. **Manures and fertilizers.** pp. 96., London; H.M. Stationery Office, 1951, 3s. [9th edn] [See *Herb. Abstr.* 11 : 3 for abstract of the 8th edition of this publication]. During the course of the last decade there has been a great increase in the consumption of fertilizers in Britain, but it is claimed that this consumption is still much below the amount which would result in maximum returns. This is especially true in regard to the manuring of the poorer grasslands. The building up of fertility and its maintenance in both arable and pasture areas are fundamental needs of farming in Britain to-day. This bulletin constitutes a guide to farmers on the use of the right fertilizers in the right amounts. The information is classified under the three headings: organic manures; fertilizers; and the purchase and use of fertilizers. There is a section (covering 10 pages) on the manuring of the following crops: wheat, barley, oats, mangolds, sugar-beet, potatoes, turnips and swedes, cattle cabbages, fodder maize, beans and other leguminous crops, seed hay, meadow hay, and pastures.—M. Hall.

REPORTS

The notes below under Reports indicate the main investigation in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated by giving a reference to the abstract.

319 **Rothamsted** Experimental Station, Harpenden. Report for 1950. St. Albans, 1951, pp. 184, 7s. 6d.

Investigations reported:

1. The effect of deep and shallow ploughing, and of fertilizers, on yields of field crops, in a six-course rotation, pp. 27-8.
2. The effect of irrigation and nitrochalk applications on the yield of sugar-beet, pp. 28-9, and 119-20. Yields were increased by irrigation but not by nitrogen.
3. A method of estimating evaporation from green vegetation, p. 29. This method has now resulted in the issue of fortnightly estimates by the Meteorological Office.
4. The comparative effect of superphosphate and silicophosphate on the yields of swedes, potatoes and cereals, pp. 36-7. Silicophosphate was as effective as superphosphate on swedes, but less effective on cereals.
5. The effect of placement of fertilizers in bands on deep and shallow-rooting crops, pp. 37-8.
6. The effect of placement of fertilizers on sugar-beet crops, p. 38. The only advantage over broadcasting is that labour is saved.
7. The effect of placement of fertilizers on the yields of field beans and peas, pp. 38-9. Placed

ertilizers gave higher yields than broadcast ertilizers.

3. Manganese deficiency in skirtland fen soil, p. 43. In pot experiments, all additions of manganese significantly increased the yield of oats. No treatment prevented the appearance of blackspeck.

). Increases in barley yields due to the residual ffects of superphosphate and farmyard manure pplied between 1856 and 1901, pp. 43-4.

10. The effect of carbohydrate content of the root n the uptake of nitrate, phosphate and potasium, p. 56.

11. The uptake of nutrients through the leaves rom sprayed solutions, p. 56.

2. The relation between high sugar content of the eaves and the susceptibility of sugar-beet to yellows'. Differences in susceptibility were proluced by varying the amount of water supplied efore the plants were inoculated, p. 71.

3. The discovery of an aphid-transmitted sugareet virus similar to 'yellow net' of America, . 72.

4. The use of radioactive phosphorus for investiating the feeding behaviour of *Myzus persicae* on ugar-beet and turnips, pp. 72-3.

5. Field trials on the control of sugar-beet and angold virus diseases, pp 74-5.

6. A rotation experiment on the control of eyepot, *Cercosporella herpotrichoides*, and take-all, *phiobolus graminis*, pp. 76-7.

7. Pot experiments on the effect of nitrogenous ertilizers, applied at different times, and of watering at different times, on the incidence of eyespot, . 77.

8. Rye and vetches as hosts of the oat race of the tem eelworm, *Ditylenchus dipsaci*, p. 83.

9. Population densities of two gall-midges attacking wheat, p. 92. The midges can remain underround for as long as 9 years.

0. Bean aphis infestation, pp. 92-3.

1. Wireworm control by BHC, DDT and DD ressings and their effect on the yield of wheat, p. 109-10.

2. An experiment to determine the effect of arathion, HETP, nicotine, and DDT on the ontrol of the field bean aphis (*Aphis fabae*), pp. 10-11.

3. Ley/arable rotation experiments, p. 113.

4. The effect of late nitrogenous top dressings on ereals, pp. 115-16. There were no yield increases ut the N% of both grain and straw was increased.

5. The effect of certain weeds on the growth of arley, p. 129.

6. The effect of manuring on the bolting of beet ops at Woburn, p. 129.

7. A survey of fertilizer practice with arable ops, pp. 137-46.—C.W.S.H.

20 **Cambridge,** National Institute of Agricultural Botany. Fifth and Sixth Report of the Seed Production Committee. *J. nat. Inst. agric. Bot.* 1951, **5**, 489-539. [Cambridge]

321 **Empire Cotton Growing Corporation.** Progress reports from Experiment Stations. Season 1949-50. London, 1951, pp. 140, 3s.

The work of the Experiment Stations in Africa, the British West Indies and Australia is reported. A research programme has been planned for the new Central Research Station, Namulonge, Uganda, where breeding work has already started, and a system of ley farming using 3 years' cropping and 3 years' grass has been adopted. The research programme for this station is discussed in detail, and the programmes of other stations are given in outline.

INVESTIGATIONS REPORTED:

From Uganda, Namulonge

1. The establishment of modal bulk of BP. 52 cotton and the selection of new lines, pp. 6-8.
2. A yield trial with BP. 52 strains, pp. 8-9.
3. A variety trial with three BP. 52 types, B. 181 and S.47, pp. 10-11.

From Uganda (Report of the Senior Botanist)

4. The history of blackarm disease (*Xanthomonas malvacearum*) investigations in Uganda and the breeding of resistant varieties, pp. 20-2.

From Anglo-Egyptian Sudan, Gezira, Shambat, and Kadugli

5. The relation between grade and date of picking, p. 26.
6. The effect of sowing date on yield and grade, pp. 26-7.
7. A variety trial with Sakel and X.1730 types at Gezira, p. 29.
8. The breeding of blackarm- and leafcurl-resistant strains, pp. 31-2. A blackarm- and leafcurl-resistant strain, BLR. 14/16, has been produced. A blackarm-resistant B_2B_3 Sakel is also to be made leafcurl-resistant. In the X1730 type, breeding for blackarm-resistance is complete.
9. The breeding of Jassid-resistant strains, pp. 33-4. Use is being made of BLR. 14/16, and it has been shown that hairiness of Upland types can be transferred to Sakel types.
10. Selection and hybridization at Shambat for yield, pp. 34-5.
11. Selection and hybridization at Kadugli, pp. 42-3.
12. The improvement of lint-length and lint-quality in strain BAR. 7/8, p. 43.
13. Two variety trials at Kadugli, pp. 43-4.
14. The effect of seed-rate, thinning date, spacing and final stand on yield, pp. 44-5.
15. Cytogenetics, pp. 36-40. Cytogenetical work carried out is described. Particular attention has been given to the relationship of wild and cultivated species.

From Tanganyika, Lake and Eastern Provinces
16. The effect of resting under Elephant grass, bulrush millet, *Cynodon* sp., *Hyparrhenia* sp., and pigeon pea, with farm-yard manure dressings, on the yield of cotton, the indicator crop, pp. 54-5.
17. The effect of continuous bulrush millet cropping, with various manurial treatments, and of grass fallows on the yield of cotton, pp. 55-6 *Cenchrus ciliaris* has proved the most satisfactory grass for this purpose in the Lake Province.
18. The direct and residual effects of organic manuring with compost and farm-yard manure on the yields of cotton, sorghum and millet, pp. 56-7.
19. The effect of tie-ridging on manured and unmanured cotton plots, p. 57.
20. The effect of compost and superphosphate on the yields of cotton and sorghum, p. 57-8.
21. The effect of sulphate of ammonia, triple superphosphate and compost on the weight of cotton stalks, pp. 58-9.
22. The varying effects on cotton and sorghum yields of tying and ridging on several soil-types in the Lake Province, p. 60.
23. The interrelationships of cultivation, weed control and yield, pp. 60-1.
24. Cotton breeding, pp. 61-4. The results were seriously affected by American bollworm and Jassid attacks.
25. The susceptibility of Ukiriguru strain to bacterial blight (*Xanthomonas malvacearum*), p. 65.
26. The effect of DDT on shedding due to bollworm and on the incidence of aphid attack, p. 69.
From Nyasaland
27. Variety trials, pp. 72-3. Commercial CLB outyielded all selections in the absence of red bollworm attack.
28. An attempt to control red bollworm by a local close season, p. 73.
From Southern Rhodesia, Gatooma
29. Strain trials and selections, pp. 75-7.
30. An NPK placement trial, p. 77.
31. Insecticide trials. The effect of DDT on yield and the effect of Pestox III on aphid populations, p. 78.
32. Mechanization trials for harvesting and end-of-season cotton plant destruction, pp. 78-9.
From South Africa, Barberton
33. Variety trials and observations on strain characteristics, pp. 83-5. The previous highest yielding strain, A2106, has not maintained its superiority over other strains.
From Northern Nigeria
34. Selection and variety trials, pp. 92-7.
35. A study of the seasonal activity of the red bollworm (*Diparopsis* spp.), pp. 100-5.
36. Insecticide trials with DDT, BHC and Toxaphene against *Diparopsis* and other bollworms, pp. 109-12.
From Antigua
37. The residual effects of previous pen manure and fertilizer applications on cotton and maize yields, pp. 116-17.
38. The effect of placement of superphosphates on the germination and growth of cotton, p. 117.
39. The effect of N and P applications and the residual effects of previous NPK applications on the yield of cotton, p. 118.
40. The effects of various crop rotations and of close-season cropping on the yields of cotton, pp. 119-21.
From Montserrat
41. The effect of ammonium sulphate and superphosphate on cotton yields on fresh ash and brown earth soils, pp. 127-8.
42. The effect of bare fallows and weed fallow between cotton crops, pp. 128-9.
From St. Vincent
43. A nitrogen manurial experiment: the effect of type of manure, quantity and time of application on cotton yields, pp. 131-2.
44. NPK trials on 4 soil types, pp. 132-4.
From Queensland, Biloela
45. Irrigation and rotation experiments, pp. 136-7.
46. Variety trial, p. 138. Stoneville 2B gave the highest yield and was structurally most suited to mechanical harvesting.
47. The effect of DDT and E605 spraying on the control of the corn ear-worm, *Heliothis armigera*, p. 139.—C.W.S.H.

322 **France.** Travaux effectués en 1949 par les stations agronomiques. [Work carried out in 1949 by agronomy stations.] *Ann. Inst. nat. Rech. agron.* Sér. A, 1950, **1**, 529-661.

INVESTIGATIONS REPORTED:
1. Absorption of arsenic by plants. By P. Boischot and Mlle Tyskiewicz (Versailles), p. 556. [See *Fld Crop Abstr.* 4 : 855]
2. Modifications in plant composition caused by the application of a fertilizing element during development. By A. Hamy (Châteauroux), pp. 557-60.
3. Effect of coating of segmented seed of [sugar-] beet. By J. Guérillot-Vinet and others (Grignon), p. 562. [See *Fld Crop Abstr.* 3 : 472]
4. Influence of time of applying nitrogen manure to sugar-beet. By G. Joret and H. Hiroux (Amiens), pp. 564-7. The time of application of nitrogen fertilizers, (a) before sowing, (b) part before sowing and part at singling, had no material effect on yield of roots, but the latter method (b) acted, to some extent, as an insurance against a long period of drought because by this method fewer plants failed to develop.
5. Nitrogen manuring of wheat. By Y. Côic and others (Quimper), pp. 584-5. [See *Fld Crop Abstr.* 4 : 964]
6. Influence of sodium on the development and composition of the plant. By Mlles J. Garola and

R. Cadier (Chartres), pp. 592-600. No increase in yield of sugar-beet was observed as a result of sodium or potassium fertilizers. Climatic conditions more favourable than those obtaining at the time of the experiment are required for judging the action of sodium on development of sugar-beet.
7. Fertilization by manganese sulphate. By Y. Cöic and others, pp. 607-13. [See Abs. 112]
8. Manuring of spring wheat. By P. Anne and others (Colmar), pp. 614-15.
9. Nitrogen manuring of spring wheat (variety: Fylgia) in Beauce. By L. Depardon (Blois), p. 616.
10. Comparative delayed action of a mineral manure and several organic manures on the yield of spring wheat. By P. Gouny and others (Antibes), pp. 616-18.
11. Trials of spring manuring on winter wheat. By G. Mathieu (Dijon), p. 618.
12. Manuring of winter wheat. By P. Anne and others (Colmar), pp. 618-21.
13. Influence of nitrogen fertilizer on rice. By J. Bordas and Mme Huguet (Avignon), pp. 621-3.
4. Antibiotic substances (Grignon), p. 654. The action of derivatives of quinone, particularly 2 methoxy-1-4-naphthoquinone, on parasitic organsms of plants, expecially during seed germinaion.—D.B.

323 **Cyprus.** Quarterly Review No. 24. Nicosia, 1951, pp. 22.

NVESTIGATIONS REPORTED:
Herbicide trials, p. 12. Shell weedkiller 7A had ome effect upon *Cynodon dactylon* and *Paliurus ustralis* but more than one application appears ecessary to obtain complete control. Pentahlorophenol concentrate was ineffective against P. *australis*. Cereal rotation and fertilizer trials, p. 12-13.—N.G.S.

24 **St. Helena.** Annual Report of the Department of Agriculture and Forestry for 1950. Scotland, 1950, pp. 18. [Received 1951]

NVESTIGATIONS REPORTED:
Cereal varietal trials. Because of the depredaons of birds, only the awned types were successul, p. 13.
Oat varietal trials, p. 13. The variety Ceirch lwyd S75 produced the heaviest crop of good odder.
Barley varietal trials, p. 13. An unnamed outh African variety produced the heaviest yield, 2 cwt. per ac.
Wheat varietal trials, p. 13. The varieties orentoe, Stirling and an un-named variety yielded the heaviest crops.—K.L.

25 **Bechuanaland Protectorate.** Annual Report of the Department of Agriculture for 1950. Mahalapye, 1950, pp. 9. [Received 1951]

INVESTIGATIONS REPORTED:
1. Varietal trials with maize, millet (*Pennisetum typhoideum*), groundnuts, sunflowers, sweet sorghum and beans, p. 2.
2. Grain sorghum varietal trials, p. 2. Dwarf varieties from USA are showing promise.
3. Maize variety trials at Mahalapye Experiment Station, p. 3. A multiple-pureline cross is considered to be better suited to the present level of African agriculture than double-hybrid maize.
4. Fertilizer trials to ascertain the chief mineral deficiencies of the area, p. 3.
5. Comparison of the effects on the succeeding crop of winter and summer ploughing, p. 3.
6. The effect of 3 fertilizer treatments (200 lb. and 400 lb. superphosphate and 400 lb. superphosphate plus 200 lb. ammonium sulphate per acre) on maize, sorghums, sunflowers and groundnuts, p. 5. The sorghums showed little response to the fertilizers. Maize and sunflowers gave yield increases of 37% and 40% respectively over the controls following the application of 400 lb./ac. superphosphate. Groundnuts gave a yield increase of 54% over the control following the application of the superphosphate plus ammonium sulphate.
—K.L.

326 **Nigeria.** Annual Report on the Agricultural Department for the year 1949-50. Kaduna, 1951, pp. 92.

INVESTIGATIONS REPORTED:
1. The effect of applications of compost, made from household refuse and crop residues, on the yields of guinea corn and millet, pp. 17-18.
2. Mechanization trials in the cultivation of rice and upland crops, pp. 22-3 and 41.
3. Spacing trials with groundnuts, pp. 26 and 62. Close spacing, 43,560 plants per acre, gave the highest yield. With this population a spacing of 2ft. × 6in. gave a higher yield than 3ft. × 4in.
4. Fertilizer trials with yams, p. 49.
5. The value of *Acioa barteri* as a shrub fallow plant, p. 50.
6. Manurial experiments on rice, p. 52.
7. Maintenance of soil fertility. Experiments to determine the optimum length and type of fallow for use prior to a rotation of cotton/guinea corn/groundnuts, pp. 61-2.
8. Effect of grass fallows on the yield of guinea corn, p. 63. Burning the grass resulted in a higher yield of guinea corn than carrying it off as fodder.
9. Breeding and selection of cotton strains, pp. 64 and 70.
10. Spinning tests on cotton varieties, p. 65.
11. Groundnut selection and variety trials, pp. 65-6.
12. Selection of guinea corn varieties, p. 66.
13. Soyabean variety trial, p. 66. The imported variety Avoyelles is likely to replace varieties at present grown in the Zaria area.

14. Selection of benniseed (*Sesamum indicum*) varieties, pp. 66-7.
15. Selection of cassava varieties for yield and virus disease resistance, pp. 70-1.
16. An experiment on methods of planting cassava cuttings, p. 71. At Umuahia, a trial in which cassava sticks were planted horizontally, vertically, and obliquely showed no difference in yield between the three methods.
17. The residual effect of previous applications of superphosphate and gypsum on the yield of groundnuts, pp. 72-3.
18. Phosphate placement trials on groundnuts, p. 73.
19. A study of the annual cycle of the cotton red bollworm, p. 79.—C.W.S.H

327 **South Africa.** Annual Report of the Department of Agriculture for the year ended 31st August, 1950. *Fmg S. Afr.* 1950, **25**, 448-504. [Received 1951]

INVESTIGATIONS REPORTED:
1. Sorghum varietal trials, Upington, p. 449.
2. Fertilizer trials with groundnuts, Upington, p. 449.
3. Cotton varietal trials, Barberton, pp. 449-50.
4. Varietal trials with *Hibiscus cannabinus* and *H. sabdariffa*, Barberton, p. 450.
5. Studies on streak-resistance and yielding capacity of maize, Barberton, p. 450.
6. Effect of green manuring on succeeding wheat crop, Hartebeestpoort, p. 451. Sweet sorghum increased wheat yields but Babala (*Pennisetum purpureum*) depressed them.
7. Fertilizer, espacement and hormone weed-killer trials on maize, Bethlehem and Kroonstad, p. 451.
8. Maize breeding trials, Potchefstroom, p. 457.
9. Wheat varietal trials, Potchefstroom, p. 457. Variety Scheepers remained outstanding for dry-land conditions.
10. Soyabean varietal trials, Potchefstroom, p. 457.
11. Sunflower varietal trials, Potchefstroom, p. 457.
12. Experiments on the control of witchweed (*Striga lutea*) on maize and kaffir corn by means of crop rotations and the breeding of resistant varieties, Potchefstroom, p. 457.
13. Experiments on interplanting maize with soyabeans for hay or Italian ryegrass for winter grazing, as a means of weed control, Cedara, p. 459.
14. Oat varietal trials, Cedara, p. 459.
15. Maize, sorghum, and lupin varietal trials, Glen, p. 465.—K.L.

328 **Southern Rhodesia.** Report of the Secretary, Division of Agriculture and Lands for the year ended 30th Sept., 1950. Salisbury, 1951, pp. 17.

INVESTIGATIONS REPORTED:
Trials with hybrid and open-pollinated varieties of maize showed the superiority of hybrid varieties, pp. 5-6.
Varietal trials with dwarf and tall sorghums and millets at Matopos Research Station, p. 6.—K.L.

329 **Southern Rhodesia.** Salisbury Agricultural Experiment Station. Annual Report of Experiments, season 1949-50. *Rhod. agric. J.* 1951, **48**, 34-61.
[See also *Fld Crop Abstr.* 3 : 1571]

INVESTIGATIONS REPORTED:
1. Crop rotation experiments, pp. 35-45. The trials comparing the yields of maize grown continuously with applications of phosphate, and maize alternating every third year with a leguminous crop, are continuing.
2. Maize rotation trials to determine the effect on maize yields of legumes grown at varying intervals in the rotation for (a) green manure, (b) hay, (c) seed production, pp. 45-7.
3. The effect on subsequent maize yield of velvet beans, sunn hemp, dhal, Sudan grass, munga and castor-oil plant ploughed under for green manure, p. 48.
4. The effect on the yield of maize of different sowing distances, and a comparison of yields of different maize strains at these spacings, pp. 48-9. The 3 hybrid strains 49 H. 40, 49 D.H. 16, and 49 D.H. 31 significantly outyielded Hickory King.
5. The effect of different sowing dates on the yields of hybrid and open-pollinated strains of maize, pp. 49-50.
6. Effect of (a) nitrogenous fertilizer and (b) muriate of potash, applied at different stages of the plant's growth, on maize yield, pp. 50-2.
7. Comparison of the yields of various single- and double-hybrid strains of maize, pp. 52-5, and 56-7. Results are tabulated.
8. Velvet bean variety and strain trials, pp. 55 and 57.
9. Soyabean strain and sowing distance trials, p. 58.
10. Sunflower variety trial, pp. 58-9. Southern Cross and Mars have outyielded all other varieties.
11. Groundnut varietal, phosphatic fertilizer and inter-row cultivation trials, p. 59.
12. The effect of planting various crops, immediately after ploughing grass leys, on the yield of the subsequent maize crop, pp. 60-1. Highest maize yields followed sunn hemp; lowest yields were after sunflower. Velvet beans, soyabeans and groundnuts, were intermediate in their effects on maize.—K.L.

330 **Falkland Islands** Department of Agriculture. Annual Report for 1950. Stanley, Falkland Islands, pp. 4. [Received 1951]
Flax, variety Liral Prince, was found to grow well in small experimental sowings.—C.L.S.

331 **United States** Department of Agriculture. Report of the Administrator of Agricultural Research, 1950. Washington, 1951, pp. 488.

INVESTIGATIONS REPORTED :

Bureau of Agricultural and Industrial Chemistry

1. The evaluation of 3 potential southern oilseed crops, pp. 39-41. A note is given on the composition of the oil of sesame (*Sesamum orientale*), buffalo gourd (*Cucurbita foetidissima*) and safflower (*Carthamus tinctorius*).

2. The relation between the crude fat and crude fibre content of wheat as an indication of its milling quality, pp. 50-1.

3. Tests with new types of plant-growth regulators, p. 116. The carbamic esters of both 4-dimethylamino thymol and 4-dimethylamino carvacrol methiodide reduced bean plant growth rates and also modified their growth.

Bureau of Entomology and Plant Quarantine

4. Boll weevil [*Anthonomus grandis*] insecticides, pp. 286-7. In trials near Waco, Texas, DDT alone at 1 lb. per ac. and 2 lb. Toxaphene plus 1 lb. DDT per ac., applied as sprays, gave significantly higher cotton yields than 2 lb. per ac. of Toxaphene. 10 to 12 lb. per ac. of a dust made up of 0% DDT and 2% gamma isomer BHC gave excellent bollworm control in a number of trials.

. Control of cotton aphid, p. 288. Eight separate treatments with 10 lb. dust per ac. containing 0.25% to 1% of Parathion, or 1% gamma somer BHC, gave complete control of cotton aphid.

. The treatment of cotton plants with a sysemic insecticide toxic to aphids and mites, pp. 88-9. Evidence showed that cotton plants took up enough octamethyl pyrophosphoramide to be oxic to cotton aphids and mites. The plants bsorbed the chemical via their roots following soil pplications, and via their leaves following spraying. The compound was not toxic to boll weevils, ollworms, or several other cotton insects.

Bureau of Plant Industry, Soils and Agricultural ngineering

New wheat varieties, pp. 362-3. A note is iven on the three leading winter wheat varieties in 949, Pawnee, Comanche and Triumph, the leading oft red winter wheat Thorne and the leading pring wheat Mida. Among the most recently eveloped varieties are Apache and Quanah for the reat Plains, Elmar and Brevor for the Pacific orthwest, Lee for the northern Plains and Atlas 0 and 66 for the southeastern areas.

Andrew oats, p. 363. A description is given of his variety, which has given outstanding yields ver a wide area.

New, virus-resistant winter oats, pp. 363-4. A description is given of Atlantic and Arlington, wo new virus-resistant winter oat varieties adapted Georgia, Virginia and N. Carolina.

10. Barley varieties for Alaska, p. 365. In trials at the Alaska A.E.S., Edda, a Swedish variety, yielded an average of 30% more grain than Olli, the present standard variety in this area.

11. A new rice variety, p. 367. A description is given of Century Patna, a selection of a cross Texas Patna x (Rexoro × Supreme Blue Rose). It matures in 120 to 125 days, has short, stiff straw, is smooth-hulled and is suitable for combining. It is adapted to Arkansas, Louisiana and Texas and is suitable for growing with the mid-season variety Bluebonnet and the late varieties Texas Patna and Rexoro, to extend the period of harvest of premium-quality varieties.

12. Redwood, a new, rust-resistant oil flax, pp. 367-8. Redwood has been recommended by the Minnesota A.E.S. It is resistant to all known races of flax rust and wilt, and is moderately susceptible to pasmo.

13. High rutin content buckwheat (*Fagopyrum esculentum*) breeding, p. 368. Work is in progress to adapt a new buckwheat introduction from N. India to USA conditions. It produces twice as much leaf as the normal US varieties.

14. The production of cotton varieties with new and extended fibre properties, pp. 382-3. A note is given of Hopi-Acala, produced from a cross of Upland Acala and a primitive Hopi cotton from the southwest. This variety has a staple of $1\frac{1}{16}$ to $1\frac{1}{32}$ in.

15. Sorgo syrup production, p. 388. A new variety, MN 1034, is scheduled for release in Alabama, Georgia, Tennessee and Mississippi. It is resistant to a number of diseases and has yielded 10 to 15% more syrup per ac. than the best varieties now cultivated.

16. High-yielding sugar sorghum, p. 388. Trials with sugar sorghums such as Rex, Collier selections and others have indicated their possibilities as supplementary sugar crops in S. California. The best varieties tested yielded more than 16 tons of stalks per ac., with a sugar content of 14%. Pilot plant trials have shown the feasibility of extracting sorghum sugar by standard factory methods.

17. Disease resistant sugar-beet varieties, pp. 388-9. A new variety designated 48B3-00 has been produced. It is highly resistant to black root and leaf spot diseases and has a high yield. A new variety, US 35/2 has been released. It combines high curly-top resistance with high sugar content and is adapted to inter-mountain districts and for spring sowings in south and central California.—P.J.B.

332 **Cornell University** Agricultural Experiment Station. 63rd Annual Report 1950. Ithaca, 1950, pp. 192.

INVESTIGATIONS REPORTED :

1. Isolation and study of enzymes controlling

plant and animal metabolism. By J. B. Sumner and others, p. 111. Studies are in progress on the breakdown of carotene in plants and on the isolation and estimation of the enzyme phosphorylase.
2. Studies on the translocation of solutes in plants, tissues concerned in translocation and factors influencing the rate and direction of movement. By O. F. Curtis and L. Knudson, p. 115. Work is in progress on the effect of 2,4-D and indole acetic acid on translocation within plants.
3. Influence of various factors on the production of nodules on excised roots of legumes. Nitrogen fixation studies. By D. G. Clark, p. 116. Studies have been made of the amino acids occurring in soyabean root nodules and the use of C_{14} in CO_2 to determine fate of carbon assimilated by the plants.
4. Biology and control of the seed corn maggot, *Hylemyia cilicrura*. By H. H. Schwardt and S. S. Ristich, p. 130. Light applications [rate not stated] of either chlordane or Parathion made to the soil 3 to 7 days before sowing resulted in significant stand increases and reductions in the percentage of injured bean plants, compared with untreated plots.
5. Control of quack grass (*Agropyron repens*). By W. E. Snyder, p. 135. Applications of 0.25% solutions [rate not stated] of maleic hydrazide to soil containing dormant rhizomes of *A. repens* completely prevented their subsequent growth and also the production of new rhizomes. Spraying the young plants with 0.5% solutions of maleic hydrazide containing 0.03% of Antarox A200 as a wetting agent eventually killed all the plants.
6. Wheat, oats and barley breeding. By N. F. Jensen and A. A. Johnson, pp. 142-3. A new 2-row spring barley named Erie has been released. It is resistant to powdery mildew and yielded about 2 bu. per ac. more than the standard variety Alpha. Work is in progress on the winter wheat strain 828al-2-3, which has proved superior to Cornell 595 and Yorkwin.
7. Diseases of small grains. The root rots of oats and their control. By G. C. Kent and W. C. Paddock.—P.J.B.

333 **Georgia** Agricultural Experiment Station. 62nd Annual Report, 1949-50. Experiment, 1950, pp. 92.

INVESTIGATIONS REPORTED:
1. Cotton seed treatment trials, pp. 15-16. Trials were carried out with 13 different seed-treatment compounds using acid-delinted seed of Coker 100 Wilt. All treatments resulted in a significantly higher emergence from treated seed, as compared with controls.
2. Empire cotton studies, pp. 16-17. Data are given of comparative trials showing that Empire is adapted to a wide range of growth conditions in Georgia and has produced yields equal to, or above, those of all the other varieties tested.
3. Hybrid maize trials, pp. 18-20. Brief notes are given of hybrid strains adapted to different regions of Georgia.
4. Wheat variety trials. Chancellor has shown the highest degree of frit fly resistance of all the varieties tested. In the lower Coastal Plains area, the relatively low incidence of cold, winter weather is insufficient to break the winter dormancy of Chancellor.
5. Fertilizer trials with maize, pp. 25-6. See Abs. 76.
6. Cover crop sowing in cotton, pp. 29-30. Work has been carried out on equipment for the sowing of cover crop seeds in cotton prior to its harvest.
7. Groundnut breeding, pp. 47-8. Three new strains have been released to growers, Spanish 146, North Carolina 56-15 and Virginia Bunch 67.
8. The control of Southern blight (*Sclerotium rolfsii*) in groundnuts, pp. 49-50.
9. Cotton insect control with improved insecticides under north Georgia conditions, pp. 56-7. Outstanding control of cotton insects was obtained with an emulsion containing 40% technical Toxaphene and 20% DDT, applied at a rate of 2 lb. of Toxaphene per ac.—P.J.B.

NEWS ITEMS AND NOTES

Great Britain

334 THE BRITISH COUNCIL. The activities of the Council were on a reduced scale, because of a reduction in its grant from Parliament. Lecture tours on agricultural subjects were arranged for Sir John Russell in Africa, India and Pakistan; for Sir Harold Glover in Central and South America; for Professor G. E. Blackman in Spain; and for G. V. B. Hereford, Esq., in Portugal. A combined book and periodical exhibition was held in Lima, Peru. No mention is made of some very useful services provided by the Agriculture Department of the Council. *The British Council. Report for the year 1950-51.*—N.G.S.

335 SCIENCE MUSEUM. In July, 1951, the agricultural section of the Science Museum, South Kensington, was reopened for the first time since the war. The exhibits are concerned with mechanical aspects of agriculture, that part devoted to the plough being of particular interest. The section is well laid out, and an unusual mural executed in wire portraying ancient Egyptian, mediaeval and modern farming serves to emphasize the agricultural value of the section and to enhance the effectiveness of the display. —N.G.S.

enmark
36 BEES AND INSECTICIDES. Of late years, the indiscri-
ninate use of insecticidal and herbicidal sprays and dusts
n Denmark has led to mounting losses among bee popu-
ations. In the face of agitation from bee-keepers and the
ealization of the decisive role played by bees in the seed
roduction of cruciferous crops, the Danish Ministry of
griculture is now formulating a law which will render
legal the indiscriminate spraying of crops at flowering
ime. *Dansk Frøavl* May, 1951.—P.J.B.

rance
37 MAIZE HYBRIDS. France requires 7,600,000 q.
aize per year. The French Ministry of Agriculture plans
attain this by increasing the area under maize from the
resent 300,000 ha. to 400,000 ha. by 1955 and by in-
easing yield per ha. from 15.5 q. to 19.0 q. The increase
the area of maize can be achieved by extending its
ltivation northward. Hybrid and other varieties have
een recommended for regions extending from the north
the south of France. They are: for the north, Pride
IA and Pride B 23; for the central zone, Pride PN 16,
ekalb 56 and Minybrid 706 (white); and for the southern
one, Iowa 4417, Pride D 56, U2 (white) and U3 (white).
otasse April, 1951.—D.B.

aly
38 EUROPEAN CONFEDERATION OF AGRICULTURE. The
pening ceremony of the 3rd general assembly of the
uropean Confederation of Agriculture took place in
enice, on 23 September last, with the participation of
legates from 16 countries of Europe, North Africa and
e Near East. Agricultural progress, preservation of
ral property on a family basis, and the improvement of
e standard of life of people on the land are among the
ms sought by the Confederation. *G. Agric. Domen.*
ptember, 1951.—E.B.

etherlands
9 ANNIVERSARY. The 75th anniversary of the opening
the Netherlands State Agricultural School at Wagen-
gen was celebrated on 13-15 September, 1951.—P.J.B.

itzerland
0 SWISS METEOROLOGICAL STATION. W. Kuhn writing
Schw. Landw. Mh. March, 1951, gives a short account
the history and work of the Schweizerische Meteorolog-
he Zentralanstalt, Zürich, from 1864 to the present
ne. Since removing to the new building in 1949, it has
en possible to make microclimatic observations for
dying the effect of climatic factors on plants and
imals. In this connexion the Schweizerische Meteorol-
ische Zentralanstalt will work in closer co-operation
th the Federal Agricultural Research Stations.—D.B.

chuanaland
1 AGRICULTURAL DEVELOPMENT. Three pilot schemes
swamp clearance have been approved. If these prove
cessful, a £1.5 million swamp clearance scheme will be
dertaken. *World Crops* July, 1951.—N.G.S.

Iraq
342 ARCHAIC ADVISORY LEAFLET. An archaeological expedition from the University of Chicago and the University Museum of Philadelphia, has discovered a farmers' bulletin, dating from 1750 B.C., at Nippur, in Iraq. This consists of instructions for corn growing written on a clay tablet in Summerian cuneiform script. These instructions deal with ploughing, sowing, bird and mice control, harvesting and irrigation. The authority quoted was the god Ninurta.—*World Crops* July, 1951.—N.G.S.

Pakistan
343 AGRICULTURAL DEVELOPMENT. It is planned to irrigate and colonize five million acres of wasteland in the Thal region, which lies between the Jhelum and Indus rivers in the Western Punjab, the scheme being now under way. In 1949-50, the first year of operation, 146,660 acres were brought under irrigated cultivation. A team of agricultural and other scientific experts is being provided by the Australian Government under the Colombo plan.—*World Crops* July, 1951.—N.G.S.

Australia
344 NEW HYBRID WHEAT. A promising new hybrid wheat, Pusa III × Kenya C6041 × Baringa C15418 has been bred at New England Experiment Farm. It is resistant to stem rust, and has good quality straw. The grain is vitreous, threshes easily and is of a highly satisfactory baking quality. Although no seed is available yet for commercial distribution it is possible that, because of its rust resistance, it will soon replace Yalta. *Agric. Gaz. N.S.W.* April, 1951.—K.L.

345 SEED EXCHANGE. The Commonwealth Scientific and Industrial Research Organisation, Melbourne, offers seed collected from various wild and cultivated plants in exchange. Particulars of the seed available may be obtained from this Bureau.—K.L.

California
346 THE WESTERN REGIONAL RESEARCH LABORATORY at Albany, is one of 4 Regional Research Laboratories which have been established as part of the Bureau of Agricultural and Industrial Chemistry of the Agricultural Research Administration. Commodities investigated include rice, sugar-beet, wheat, lucerne, fruits and vegetables and dried peas and beans.—C.L.S.

Latin America
347 SCIENTIFIC INSTITUTIONS AND SCIENTISTS. The UNESCO Centro de Cooperacion Cientifica para America Latina has so far published ten volumes of the series covering the Scientific Institutions and Scientists of Latin America, for Uruguay, Argentina, Puerto Rico and Colombia, Brazil, Bolivia, Mexico, Venezuela and Chile. The volumes are of foolscap size and are lithographed. Each one consists of a smaller section covering some of the institutions in the country under consideration, and a larger section naming some of the scientists. The details are extensive, and the whole series forms a very valuable directory.—N.G.S.

FIELD CROPS

CEREALS

WHEAT

348 South Africa Department of Agriculture. Sci. Bull. No. 305. **Water requirements of alluvial Karroo soil with reference to the minimum requirements of winter cereals under irrigation.** By *M. M. Walters*. [n.d.], pp. 35, bibl. 8. [Grootfontein Coll. Agric.]

Experiments carried out at the Grootfontein College of Agriculture were designed to investigate the possible adaptation of the wheat plant to the water supply in the soil. Recommendations are made for the irrigation of shallow, red Karoo soils and the total water requirements and irrigation programmes for wheat and barley are given. Results of the experiments indicate that: (1) Wheat plants begin to wilt permanently as soon as the moisture content of the 4 ft. profile in alluvial Karoo soils falls below approximately 9 in. (2) The irrigation intensity as interpreted from the results of the heavy, medium and low irrigations had no important limiting effect on root development and caused no significant difference in yields. Light irrigations produced the highest yields per in. of water used and the heavy treatments the lowest. The conclusion is therefore drawn that the plants had adapted themselves to different irrigation intensities. (3) It was concluded that at the end of the full stooling stage the plants had developed their greatest transpiration surface, and may be irrigated in the same way for the remainder of the growing period. (4) In the heavy irrigations, conditions, particularly in the deeper footlayers, were apparently more conducive to increased local root activity than in the low irrigations.—From author's summary.

349 Šer, B. L. [**Agrotechnique and variety.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 4, 59-62.

The optimal sowing period of winter wheat for the southern, forest-steppe regions of Kiev province is from 25 August to 5 September. Sowing at a later date causes a pronounced reduction in yield due to lodging.—R.P.J.

350 Pisarev, V. E. [**Advancement of hard wheat into the non-black soil zone.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 8, 34-9. [Inst. Grain Husb. Non-Black Soil Zone]

The advancement of hard wheat into this zone is possible through the utilization of the great biological diversity within the 28-chromosome wheats. The main characteristic conditioning the advancement of hard wheat cultivation northwards is not so much early ripening as a moderate requirement of warmth in the new varieties.—R.P.J.

351 Moschini, E. Razze di grano dell'Istituto di Pisa. [**Wheat varieties of the Institute of Pisa (Italy).**] *G. Agric. Domen.* 1951, **61**, 305.

A description is given of the following new wheat varieties which are recommended to farmers: Trento (Inallettabile 3 × Mentana) suitable for the mountains and medium fertility soils of the plain and hills; Grosseto (Inallettabile 3 × Mentana) suitable for low fertility soils of the plain and hills; Pisa (Inallettabile 8 × Mentana) and Livorno (Quaderna × Luigi Razza), both suitable for medium fertility soils of the plain and hills; Ancona (Frassineto 405 × Marchetti 114) suitable for good fertility soils of the plain and hills; and Brescia (Inallettabile 3 × Chinese) suitable for high fertility soils of the plain.—E.B.

352 Del Vecchio, A. L'R 16 nel Pesarese. [**The wheat variety R 16 in the Pesaro province (Italy).**] *G. Agric. Domen.* 1951, **61**, 289.

R 16 (Pegarih × Vase Njhai) is a new variety of soft wheat of the Società Produttori Sementi of Bologna. It is early, hardy, resistant to rust, cold and lodging, and suitable for soils of medium fertility in the hills and plains of central Italy. It is sown from 20 October to 10 November at the rate of 170 to 190 kg./ha. On soils of good fertility it has yielded 48 q./ha. On heavy, badly drained soils it tillers rather poorly.—E.B.

353 Consolini, A. III Concorso Regionale per le più alte produzioni cerealicole nelle provincie lombarde. [**Third regional competition for the highest cereal yields in Lombardy.**] *Humus, Milan* 1951, **7**, No. 8, 23-4.

The performance of the wheat varieties employed is briefly described, 0.10 and Mara being the highest yielding varieties.—E.B.

354 Yazicioglu, T. Türkiye sert buğdaylarin fiziksel, kimyasal ve teknolojik vasiflari ile teknik değerleri üzerinde araştirmalar. [**Physical, chemical and baking studies on**

Turkish Durum wheat (harvest of 1945).] *Yayin* 1950, No. 24, pp. 164, bibl. 33, German summary p. 141. [Dept Agric. Tech., Univ. Ankara, Turkey]

As regards physical qualities the Turkish Durum wheat would be placed in Class IIB of USA official grain standards for wheat. The thousand-grain weight and hectolitre weight are satisfactory; specific gravity is high; kernel texture is very variable and largely dependent on climate. The Turkish Durum wheat is unsatisfactory as regards seed impurity and contains seed of several weed species. In chemical tests water content was satisfactory, protein content good, nitrogen-free extract and starch were normal, crude fat was average, crude fibre low and ash low.—D.B.

355 LUKJJANENKO, P. P. [**Two new wheat varieties.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 9, 32-5. [Krasnodar State Sel. Sta.]

Among the new varieties of winter wheat recently bred at the Station, Kubanskaja 131 and Kubanskaja 133 are of special interest for many regions of North Caucasus. These two sister lines differ markedly in morphological and biological characters. The most outstanding characteristic of the new varieties is their resistance to rust [unspecified] and in this lies their chief superiority over the varieties of winter wheat regionalized in North Caucasus (Novoukrainka 83, Vorošilovskaja, etc.). Kubanskaja 131 gives the best results in the steppe and drier regions of North Caucasus, in Dagestan ASSR, in Grozny province and in some regions of the Krasnodar and Stavropol territories. Kubanskaja 133 is better suited to the wetter regions of North Caucasus.—R.P.J.

356 LOVČIKOV, I. S. [**The Arnautka Nemerčanskaja variety of spring wheat.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 5, 70-1.

The Arnautka Nemerčanskaja variety was bred at the Nemerčansk Selection Station, Vinnitsa Province, from local hard wheat of the variety Hordeiforme (*T. durum*). It possesses valuable agricultural and biological characters and is intended for cultivation in the forest-steppe provinces of the Ukrainian SSR. Yields of the new variety have been considerably higher than those of the hard wheat Melanopus 69 and the soft wheat Lutescens 62. When cultivated after a long-duration ley, Arnautka Nemerčanskaja gives a higher yield than when it follows sugar-beet or maize. In the western provinces of the Ukraine the duration of the period from the seedling stage to the end of wax ripeness is 91 to 115 days; in the Kiev and Poltava provinces 76 to 90 days. Its resistance to lodging is higher than average; it does not shed readily. It is slightly more susceptible to loose smut (*Ustilago tritici*) than Melanopus 69.—R.P.J.

357 ELIASSON, S. Höstvetesorter och gödsling. [**Autumn wheat varieties and manuring.**] *Lantm. Svenskt Land* 1951, **35**, 628-9.

For an over-wintering crop it is essential that the nutrient condition of the soil should be satisfactory and, in this connexion, phosphate manuring is of primary importance. The autumn wheat varieties adapted for cultivation in the different parts of Sweden are indicated, together with the most suitable sowing dates.—R.P.J.

358 COOK, L. J. and HIGGS, E. D. **Results of replicated trials with wheat varieties 1948, 1949, and 1950.** *J. Dep. Agric. S. Aust.* 1951, **54**, 541-7.

Eight replicated and randomized trials with wheat varieties were carried out by the Department of Agriculture during the 1950-51 season at various centres in the principal wheat-growing districts of the State, with an additional trial on the sandy loam of Rudall on eastern Eyre Peninsula. The same varieties were grown as in the previous season, i.e., some new varieties together with older proved ones. The tables accompanying this report show the average yields per acre for the three seasons at each centre, together with percentage yield as compared with Bencubbin (representing 100). Results from each district are discussed, and yields of individual varieties compared. A list of average valorimeter figures is included to indicate quality of grain produced. Lists of recommended varieties for the different districts are also given.—From authors' summary.

359 SILVA, R. da. Variedades de trigo para as regiões produtoras. [**Wheat varieties for the producing regions (of Brazil).**] *Seleções Agricolas* 1951, **6**, No. 65, 59-60.

Wheat varieties are recommended for different areas in the Brazilian states of Rio Grande do Sul, Santa Catarina, Panará, Minas Gerais and Goiás. —N.G.S.

360 URUGUAY. Las variedades de trigo aconsejadas para la siembra de invierno. [**Wheat varieties recommended for winter sowing (in Uruguay).**] *Anex. Bol. Inst. Nac. Col.* 1951, **2**, No. 18, 12.

Brief notes are given on the behaviour of each of the recommended varieties :—Rio Negro, Frontana, Petiblanco, Klein Cometa, Litoral Precoz and Petirrojo.—N.G.S.

361 PEREKALJSKIĬ, F. [**Increasing the yields of spring wheat on turf-podzolic soils in the non-black soil zone.**] [Russian] *Sovet. Agron.* 1950, **8**, No. 5, 41-50.

A high rate of seeding, 6 to 7 million viable grains per ha. [no weights given], depending on the variety and the fertility of the soil, is essential in the cultivation of spring wheat on turf-podzolic soils. To increase the number of seedlings which establish themselves on such soils (frequently between 50 and 60% and not exceeding 75%), it is necessary to employ improved methods of soil cultivation and sowing technique, and to treat the seed with Granozan and hexachlorane prior to sowing.—R.P.J.

362 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. Adv. Leafl. 321. **Eyespot of wheat and barley.** 1951, pp. 6.
The disease is caused by the fungus *Cercosporella herpotrichoides*. It is best controlled by clean cultural methods, sound rotations and by alternating arable land with grass. Late autumn or spring sowing of short strawed varieties reduces eyespot and subsequent lodging and, although the humid conditions brought about by luxuriant growth induced by heavy manuring, favour the spread of the disease, high soil fertility also increases tillering of the growing crop which enables it to withstand attacks of the fungus much better than poorly nourished crops. Well drained land, thin seeding of the crops and the checking of proud growth in spring by grazing or by spraying with commercial strength H_2SO_4 (77%), or 12.5% by volume, applied at 100 gal. per ac. all aid in reducing incidence of eyespot.—K.L.

363 GLYNNE, Mary D. **Effects of cultural treatments on wheat and on the incidence of eyespot, lodging, take-all and weeds. Field experiments 1945-8.** *Ann. appl. Biol.* 1951, **38**, 665-88, bibl. 6, illus. [Rothamsted Expt Sta., Harpenden, Herts.]
An experiment was made on the 4th, 5th and 6th successive crops of winter wheat to determine the effects of various treatments on the disturbances which result from close cereal cropping. Eyespot and lodging were prevalent in the first year of the trial (1946); weeds in the second; eyespot, lodging, take-all and weeds in the third. Spraying with H_2SO_4 reduced the incidence of eyespot, lodging and weeds, and increased yield of grain on plots which received sulphate of ammonia (by 2.7, 2.2 and 1.0 cwt./ac. in successive years). Sulphate of ammonia increased the incidence at harvest of eyespot and lodging, reduced take-all and consistently increased yield of straw. Eyespot and lodging reduced the effect of the fertilizer on yield of grain, take-all increased it. Increase in seed rate increased the incidence of severe eyespot and of take-all; it increased lodging except when plants were dwarfed by take-all. Weight of straw and percentage straws with severe eyespot lesions independently affected lodging, together accounting for 51% of the variance in percentage area lodged at harvest and 64% of that lodged 33 days earlier. Mean yields of grain on untreated plots sown with 3 to 3.5 bu. seed/ac. fell from 26.0 to 22.5 to 11.7 cwt./ac. in successive years, whereas yields of 28.4, 29.9 and 29.1 cwt./ac. were obtained on sprayed plots sown with 1.5 to 2 bu. seed/ac., which received 4 cwt./ac. sulphate of ammonia, showing that high yields were maintained when eyespot, lodging, take-all and weeds were controlled. By 1948, yields of grain on unsprayed plots had fallen to the level of those on similarly manured plots on the continuous wheat experiment on Broadbalk field. Spraying increased grain by amounts similar to those resulting from one year's fallow on Broadbalk; but fallow had its greatest effects on plots with low nitrogen, spraying on those with high nitrogen.—From author's summary.

364 LEVINE, M. N. and others. **Wheat leaf rust studies at Saint Paul, Minnesota.** *Plant Dis. Rep.* Suppl. No. 199, 1951, pp. 17. [Dept Agric., Minnesota Univ., St. Paul]
Data are given of the reaction of about 200 standard varieties of wheat, consisting of hybrid selections and foreign introductions, tested for their reaction to different physiological races of leaf rust (*Puccinia rubigo-vera tritici*) over a 12 year period.—P.J.B.

365 ADAM, D. B. **The control of take-all in wheat after a long period of pasture.** *Aust. J. agric. Res.* 1951, **2**, 273-82, bibl. 5. [Waite Agric. Res. Inst., Univ. Adelaide]
A field experiment was conducted to ascertain the effects of various periods of bare fallow and the growing of certain crops, such as barley, oats and peas, on the occurrence of take-all, *Ophiobolus graminis*, in a subsequent wheat crop. At the beginning of the investigation the experimental site had not been cultivated for many years and it carried a variety of grasses whose susceptibility to, and infection by, take-all were established. Bare fallow periods begun in July, or earlier, in the year preceding wheat seeding, and the growing of oats for grazing during a similar period, were found to be equally effective in minimizing take-all. Shorter bare fallow periods and the growing of oats or peas to the stage of grain production were less effective as control measures. In the latter case, the unsatisfactory results were due probably to the volunteer growth of susceptible and infected grasses in the oat and pea crops. Plots seeded to wheat after barley were notably high in their incidence of take-all. Apparently none of the treatments was effective in eliminating sources of infection.—K.L.

366 ANGELL, H. R. and MILLS, Margaret. **Rotation in relation to take-all of wheat.** *Aust. J. agric. Res.* 1951, **2**, 283-5, bibl. 2. [Div. Plant Industry, C.S.I.R.O., Canberra]
Experiments were undertaken to test the effects

of 5 crop rotations on the control of take-all (*Ophiobolus graminis*) in wheat growing out of doors in drums containing infertile, sandy, alluvial soil. The rotations, lasting from 1943-6, comprised: (1) continuous wheat, (2) wheat/ranunculus/ranunculus/wheat, (3) wheat/grass/grass/wheat, (4) wheat/oats/fallow/wheat, and (5) wheat/fallow/fallow/wheat. Results obtained in the final year of the experiment, 1946, showed that although root ratings of wheat were better in rotations (1) and (3), the mean grain yield and total weight of the wheat plants in these rotations were significantly lower than those in rotations 2, 4 and 5. Thus there was no correlation between yield of grain and root rating. Control of the disease using yield as the criterion, was, therefore, obtained by a modification of the effects of the disease on the plant subsequent to infection and not by controlling root infection.—K.L.

367 GIORNALE DI AGRICOLTURA DELLA DOMENICA. Difesa preventiva dei seminati a grano dagli insetti dannosi. [**Protection of wheat crops from insect pests.**] *G. Agric. Domen.* 1951, **61**, 298.

It is recommended that the soil be treated before sowing with Geogamma at the rate of 50 to 70 kg./ha. A light harrowing should follow. Geogamma can be distributed with the following fertilizers: superphosphates, ammonium sulphate and K fertilizers, but it should not be mixed with nitrates, calcium cyanamide, quick lime, slaked lime or basic slag. If insect infestation is small, it may be sufficient to disinfect the seed with Geogamma at the rate of 1 kg. per 100 kg. of seeds. Poisoned baits of Geogamma are recommended for controlling mole-crickets.—E.B.

368 FENTON, F. A. and DAHMS, R. G. **The 1950 greenbug outbreak in Oklahoma.** *J. econ. Entomol.* 1951, **44**, 111-12.

The greenbug, *Toxoptera graminum*, outbreak of 1950 in Oklahoma was the most serious on record. About 654,000 acres of infested wheat were treated with Parathion, mostly in the emulsion form. It is estimated that this treatment gave an average increase of 4 bu. of wheat per acre.—E.B.

369 WANDEL, G. Einleitung zum Versuch der Schaffung mehrjähriger Getreidearten. [**An introduction to the attempt to produce perennial species of wheat.**] *Dtsch. Landw.* 1950, **1**, 83-4.

A brief, popular account is given of perennation, its recognition in wheat and the further cultivation of individuals selected for perennial habit.—D.B.

370 STEFANOVSKIĬ, I. A. [**Increasing winter-hardiness and productivity in hybrids of winter wheat.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 7, 21-5. [Leningrad Agric. Inst.]

It is reported that when mother plants of winter wheat were pollinated with a mixture of pollen from two or three different male forms, the F_2 hybrids were considerably more vigorous and productive than ordinary hybrids. Winterhardiness was increased from 19 to 42% compared with the parent forms, and the grain yield showed an increase of up to 22%.—R.P.J.

371 ABOLINA, G. I. [**Concerning the directed alteration of spring wheat Milturum 321 into winter wheat.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 3, 33-6, bibl. in text. [Karagandinsk Agric. Expt Sta.]

Work on the directed alteration of spring wheat Milturum 321 was begun at the Station in 1946, and in 1948 the third generation from late autumn sowing was obtained. Unaltered Milturum 321 sown in the autumn of 1948 and the winter wheat Alabasska served as controls for comparison with the changed variety. Sowing took place on oat stubble on 9 and 29 September, and 19 October. A study of the physiological processes in the plants showed that during the period of pre-winter hardening the content of fixed and free water in the tillering nodes was considerably reduced in the plants of the third generation autumn-sown Milturum 321 in comparison with the controls. Such a reduction of water produced better overwintering. Usually the content of sugars in spring wheats is inconsiderable, and this appears to be their main difference from winter wheats. In the third generation plants of autumn-sown Milturum 321 an increase in the amount of sugars had occurred. As a result of changes in length of ear, number of spikelets and weight of grain in the ear, plants of autumn-sown Milturum 321 of the third generation approximated to the winter wheat variety Alabasska.—R.P.J.

372 ALEKSANDROV, V. G. and ALEKSANDROVA, O. G. [**Anatomy of the wheat grain. Structure of the pericarp in different forms of wheat.**] [Russian] *Trudy Komarov Bot. Inst.* 1948, Ser. 1, No. 7, 263-334, bibl. 23. [Received 1950]

The work is illustrated by 60 diagrams.—M.H.

373 ČEBANOVA, T. L. and MAKAREVIČ. [**The role of the stem in the ontogeny of cereals.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **80**, No. 3, 461-4, bibl. 8. [Moscow State Univ.]

Investigations showed that in wheat, rye and oats the stem performs the function of a temporary storage organ. Stems of cereals differ from such storage organs as roots, rhizomes, bulbs and tubers only in the length of the period during which the stores remain unused. In cereals the stored material is used more rapidly than in dicotyledonous plants. In cereals, as in other plants, these stores are utilized for the formation of the sexual organs.—R.P.J.

374 KORNILOV, A. A. [**The influence of the size of the stem leaves on the formation of the ear in some wheat varieties.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **79**, 1033-6, bibl. 6.

The ear in spring wheat is formed in the photo-phase of development in dependence on the length of the vegetative period of the variety. In the earliest ripening varieties, such as Erithrospermum 841 and Melanopus 69, the photo-phase ends at the time of the appearance of the fourth leaf, and in the latest ripening varieties in the 6th to 7th leaf stage. In an investigation conducted at the Karagandinsk Agricultural Experiment Station, measurements of the ear and the number of spikelets determined at the time of the passing of the photo-phase and of the effective activity of the first 5 to 6 leaves, permit the assumption that the degree of branching depends not on the vigour of the whole leaf series, but chiefly on that of the 2 or 3 upper leaves.—R.P.J.

375 INDRA SEN SINGH. **Effect of pre-sowing low temperature treatment and post-sowing long duration of light on the flowering of wheat.** *Curr. Sci.* 1951, **20**, 271-3, bibl. 5. [Dept Agron. Balwant Rajput Coll., Agra, India]

The wheats used were the late variety Pb591 and the early variety C13. Vernalization (soaking for 7 hours in water and subjection to 34-37°F. for 5 weeks) significantly hastened flowering, the response of C13 (3 days) being significantly less than that of Pb591 (7 days). Light treatment of normal day (10.25—11.25 hr. during the period of the experiment), 18 hr. and 24 hr. significantly hastened ear emergence, the response of C13 was significantly greater than that of Pb591 at both 18 hr. and 24 hr., but not between 18 and 24 hr. Combined vernalization and light treatments showed that the effect of vernalization was significantly reduced by increasing light periods, and, in the case of C13, was completely nullified by continuous light.—N.G.S.

376 FINCH, L. R. and UNDERWOOD, E. J. **The influence of clover leys on the thiamin and nitrogen contents of wheat.** *Aust. J. exp. Biol. med. Sci.* 1950, **29**, 131-6, bibl. 11. [Inst. Agric., Univ. West. Aust., Nedlands]

Following the findings of Lee, Clare and Underwood (see *Fld Crop Abstr.* 3 : 1219) that small increases in thiamin and nitrogen contents of wheat resulted from short rotations including crop legumes, this investigation deals with the effects of much longer rotations with clover pastures on the thiamin and nitrogen contents of wheat in Western Australia and Victoria. Results of the experiment have shown that wheat grown on land which had been under a subterranean clover ley from 8 to 11 years was found, at each location and with each variety examined, to contain markedly more thiamin and nitrogen than wheat grown on adjacent non-clover land which had been frequently cropped during the preceding 5 or more years. The average improvement for all samples was found to be 21% in nitrogen content and 24% in thiamin content. A highly significant positive correlation was found between the nitrogen and thiamin contents of the samples. The importance of these findings in relation to the nutritive value and baking quality of wheat is discussed.—K.L.

377 TIUNOVA, K. P. [**The causes of the destruction of winter cereal crops through flooding.**] [Russian] *Doklady Vsesojuz Akad. S-H. Nauk* 1951, **16**, No. 4, 16-19. [Zon. Sci. Res. Inst. N.-E. Europ. Pt SSSR]

Results are reported of experiments conducted with the winter wheat Lutescens 116 in 1945 and 1947. Destruction of the plants through flooding occurs only in warm weather, when the atmospheric temperature is 11 to 20° C, or higher. With a rise in temperature, under conditions of flooding, the normal process of photosynthesis in the plants is disturbed at a time when a deficiency of carbon dioxide occurs in the water. Under such conditions the plants are easily exposed to fungous and bacterial diseases. First, the young cells of the plants are destroyed since they are richer in proteins and less protected by cutinized tissue. At higher temperatures the destructive effects of the water itself on the plants are noted. Killing of the plants begins with maceration of the meristematic tissues of the leaf sheaths. This is followed by disintegration of the chloroplasts and loss of turgor ; then sliminess develops. The resistance of the plants to injury by flooding is increased by supplementary provision of carbon dioxide and by the application of increased doses of nitrogenous fertilizers which assist in the rapid formation of new tissues to replace those destroyed.—R.P.J.

378 OVERLAND, A. and RASMUSSEN, L. W. **Some effects of 2,4-D formulations in herbicidal concentrations on wheat and barley.** *Agron. J.* 1951, **43**, 321-4, bibl. 8. [Washington Agric. Expt Sta., Pullman]

In trials during 1948 and 1949, applications of 0.5, 1 and 2 lb. per ac. of the sodium salt, amine and ester of 2,4-D were made to Idaed spring wheat, Golden winter wheat and Velvon barley. The 2,4-D was applied in water at a rate of 200 gal. per ac. in 1948 and 100 gal. per ac. in 1949. Treatments were made in the early shooting stage of the cereals, when the weeds present were succulent and growing rapidly. All three formulations at the 1 and 2 lb. per ac. rates killed annual weeds readily; the 0.5 lb. per ac. rate caused less rapid killing than the other two rates. Barley yields were materially reduced by the 2 lb. per ac. rates of amine and ester, compared with the yields of hand-weeded and untreated controls. The yield of Idaed wheat was somewhat reduced by the 2 lb. per ac. rate of ester, but the yield of Golden wheat was unaffected by any of the rates or formulations of 2,4-D. The winter wheat competed with weeds much more effectively than did the spring wheat. The 2,4-D applications had no apparent effect on the protein content of the grain of either of the two wheat varieties. The total grain yield of all the hand-weeded control plots exceeded that of the 2,4-D treated plots in the case of all the varieties studied.—P.J.B.

379 LONG, O. H. and SHERBATOFF, C. D. **Effect of nitrogen on yield and quality of wheat.** *Agron. J.* 1951, **43**, 320-1, bibl. 4. [Tennessee Agric. Expt Sta., Knoxville]

Applications of 25 and 50 lb. N per ac. were made to different plots of beardless, soft, red, winter wheat on 20 November, 8 March and 4 May. All plots were fertilized with 600 lb. per ac. of 4-12-12 (NPK) at the time of sowing. The average grain yields were about the same for both the 25 and 50 lb. N per ac. applications, except for the November treatment, where the 50 lb. per ac. application resulted in significantly higher yields than the 25 lb. per ac. application. The May treatments resulted in significantly lower grain yields than did the other treatments. The protein content of the grain of the crops treated in November and March was approximately the same, while the May treatments resulted in significantly higher protein contents than the other treatments. High gluten strengths were associated with high rates of N application at late dates.—P.J.B.

380 ZAÏCEVA, A. A. [**The importance of supplementary nitrogenous manuring in the spring for stubble sowings of winter wheat.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 8, 63-7.

On the light chestnut sandy loam soils of Karaganda province if supplementary nitrogenous manuring is omitted in the spring, the yield of winter wheat is halved compared with that of spring wheat: with such supplementary manuring the yields of the two crops are equalized. Ammonium nitrate should be applied at the rate of 30-35 kg./ha. N.—R.P.J.

381 OSTROUMOVA, O. A. [**The effectiveness of superphosphate with different methods of application.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1951, **16**, No. 7, 10-15. [Sib. Res. Inst. Grain Husb.]

Results of experiments with spring wheat Milturum 321 conducted from 1948-50 are reported. When granulated superphosphate was drilled at the rate of 1 centner per ha., with the seed, the increase in grain yield per 1 centner of fertilizer was 3 to 4 times that obtained when powdered superphosphate was applied broadcast in the autumn at the time of ploughing, or during spring cultivation. The application of 3 to 4 centners per ha. powdered superphosphate at the time of ploughing plus 1 centner per ha. of granulated superphosphate with the seed increased the grain yield by 5 to 6 centners per ha.—R.P.J.

OAT

382 TEXAS Agricultural Experiment Station. Bull. 728. **Mustang oats.** By *I. M. Atkins.* 1950, pp. 10.

Mustang is a new winter-hardy, disease-resistant oat developed from a cross between Fulwin and a Lee × Victoria selection. In conditions where winter-killing is a factor, Mustang has outyielded all other varieties, including New Nortex. Over a 7-year period at Denton, Texas, during which winter-killing occurred in 5 out of 7 years, the percentage survival of Mustang, Fulwin, Stanton, New Nortex, Frazier and Fultex was 85.8, 83, 70.4, 57.2, 53.6 and 51.2, respectively. Mustang is not resistant to stem rust, but its resistance to crown rust should be of considerable value when it is used for winter pastures in south Texas. Mustang has shown more tolerance to *Helminthosporium* blight than most varieties derived from Victoria parentage. Mustang is suitable for grain production in north and central Texas.—P.J.B.

383 COFFMAN, F. A. and others. **Overland and Cody, two new short-strawed oats for the Northwest** [**of the USA**]. *Agron. J.* 1951, **43**, 325-8, bibl. 13. [Cereal Crops and Dis. Div., Plant Industry Bur., US Dept Agric.]

Overland plants tiller vigorously and have unrivalled lodging resistance on the irrigated lands of the Northwest. The panicles are large, open and spreading. The kernels are very white, short, plump and usually awnless, with a bushel weight higher than Bannock and Markton and almost as high as that of Victory and Colorado 37, the heaviest varieties in bushel weight grown. Cody plants tiller more readily even than Overland and are rather shorter in height, but tend to lodge slightly more. The panicles are open and resemble those of Markton. The kernels are bright yellow, not so plump as those of Overland and have a slightly lower test weight than those of that variety. Both varieties are highly resistant to smut and have good resistance to the ordinary races of crown rust. Both are resistant to crown rust races 45 and 57, but are susceptible to stem rust races 8 and 10. Both varieties are highly susceptible to *Helminthosporium victoriae*, a disease not yet serious in the Northwest. Cody is a mid-season variety that has outyielded all other varieties tested on both irrigated and dryland soils. Overland is 4 to 5 days earlier than Cody, but still yields almost as highly as Victory or Colorado 37. Overland is ideally suited as a companion crop to alfalfa or clover by reason of its lodging resistance, earliness and short straw.—P.J.B.

384 ARANT, F. S. and JONES, C. M. **Influence of lime and nitrogenous fertilizers on the population of greenbugs infesting oats.** *J. econ. Entomol.* 1951, **44**, 121-2, bibl. 2. [Alabama Polytech. Inst., Auburn]

Greenhouse tests were made to determine the effect of lime and nitrogenous fertilizers on the population of greenbugs, *Toxoptera graminum*, infesting oats. Infestation counts showed that, as the rates of nitrogen increased, the population of greenbugs per unit of leaf surface decreased. The addition of lime also decreased the population of greenbugs.—From authors' summary.

385 NOVIKOV, V. A. and BARANNIKOVA, Z. D. [**The critical period in oats in relation to the intensity of light.**] [Russian] *Doklady Akad Nauk SSSR* 1950, **75**, 299-302, bibl. 2.

Experiments conducted in 1949 at the Leningrad Agricultural Institute showed that in oats, as in wheat, the period of formation of the sexual cells is critical in relation to insufficiency in the intensity of light. The onset of the critical period in relation to insufficiency of moisture in the soil also occurs at the same moment.—R.P.J.

RYE

386 KRESS, H. Kritische Betrachtungen zum Winterroggenanbau. [**Cultivation of winter rye.**] *Dtsch. Landw.* 1951, **2**, 425-7, bibl. 1. [Gülzow-Güstrow, Mecklenburg]

Because of the importance of rye as a bread grain in East Germany, advice is given on methods of cultivation for high yields. Correct time of sowing is considered to be the most important factor in the cultivation of this crop. Sowing between 15 and 30 September not only gives the highest yields of seed and straw, but also avoids damage by frit ly (*Oscinis*). Second in importance is the preceding crop; the best are sweet lupin and potatoes. The best variety of rye for Central Europe is Petkuser.—D.B.

387 BAIČUROVA, H. H. [**The Kazanskaja 5 + 6 variety of winter rye.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 8, 55-7.

The winter rye variety Kazanskaja 5 + 6 was bred at the Kazan Selection Station from families No. 5 and No. 6 of Aljpiĭskaja rye. In family No. 6 the plants were more robust, the straw was thicker and the colour of the grain was more uniform than in family No. 5. In family No. 5 the ears approximated in type to those of Lisicyna rye, and the absolute weight of grain was higher than in family No. 6. According to data for 1945-49 in the Tartar ASSR, Kazanskaja 5 + 6 gave on the average 1.4 centners more grain per ha. than Avangard. Average percentage figures for winterhardiness for 1941-48 in the Tartar ASSR were: Kazanskaja 5 + 6, 83.08; the variety Vjatka, 83.18; Avangard, 82.77. The length of the growing period of Kazanskaja 5 + 6 at the Kazan State Selection Station is 325 days. Work is in progress at the Station, designed to improve still further the productivity, winterhardiness and grain quality of Kazanskaja 5 + 6.—R.P.J.

388 OGNEV, I. M. [**A high-yielding variety of winter rye.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 6, 33-5. [White Russian St. Com. Var. Invest. Grain, Oil Herb. Crops]

The insufficiently winter-hardy, but large-grained and lodging-resistant Petkus variety was grown side by side with Vjatka and Novozybkovskaja 4. As a result of open cross-pollination of the varieties mentioned and of subsequent selection, the high-yielding, large-grained, non-lodging variety Partizanskaja mestnaja was obtained. It is characterized by its resistance to lodging and the plumpness of its grain. The best time of sowing is from 25 August to 5 September. It ripens 2 to 3 days later than Novozybkovskja 4 and, in 1950, gave grain yields of 26 centners per ha.—R.P.J.

389 BOGOMJAGKOV, S. [**A new variety of winter rye.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 10, 46-7.

The winter rye variety Omka cultivated in Western Siberia is winter-hardy, but small-grained and low-yielding. Work initiated in Siberia in 1945 by the Scientific Research Institute of Grain Husbandry has resulted in the production of a new variety, Sibniizhoz I, which surpasses Omka rye in yield by 21%, in winterhardiness by 6%, and in 1000-grain weight by 7.5 g.—R.P.J.

390 MEDVEDEV, P. F. [**Field germination of hybrid seeds of winter rye.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1951, **16**, No. 10, 21-4.

Hybrid seeds of varieties of winter rye (*Secale cereale*) obtained by open, inter-varietal cross-pollination with a sufficiently wide selection of pollen, possess increased viability compared with non-hybrid seeds. This results in an increase in percentage field germination of the hybrid seeds. In some varieties, repeated cross-pollination produces an increase in field germination compared with cross-pollination performed once only. Experiments conducted over 2 years indicated that the varieties of the steppe geographical group showed the largest increase in field germination.—R.P.J.

BARLEY

391 Eichler, V. E. **Growing barley on sandy soil [in South Australia].** *J. Dep. Agric. S. Aust.* 1951, **54**, 408.

This is a popular account of the author's experiences of growing barley on sandy soils in South Australia.—K.L.

392 Sviridonov, M. G. [**Local barleys of Tubin province.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 4, 31-5. [Tubin Agric. Expt Sta.]

The province of Tubin, particularly the western part, represents in itself a preserve of local varieties and forms of barleys which are found growing alone and in uniform and constant mixture-populations. The results of trials conducted by the Tubin Agricultural Experimental Station with some local varieties, including Černyĭ Barunskiĭ and Mestnyĭ Barunskiĭ barley, are reported. Černyĭ Barunskiĭ is medium early; the period from establishment to wax ripeness being 70 days. It is resistant to dryness of soil and atmosphere and tolerates spring frosts well. It is slightly susceptible to *Ustilago nuda* and *U. kolleri*. It gives high yields. Mestnyĭ Barunskiĭ barley is medium early, the period from establishment to wax ripeness being 74 days. Its absolute grain weight is 43 g. It tolerates well atmospheric dryness and spring frosts; is slightly susceptible to *Ustilago nuda* and *U. kolleri*; can be cultivated at high elevations; and has given high yields during 5 years. Tabulated data show that these two local barleys possess properties of great biological and agricultural value.—R.P.J.

393 Guenthart, E. and others. Hexahaltige Saatschutzmittel zur Verhütung von Drahtwurmschäden und zur Drahtwurmbekämpfung. [**Seed treatment preparations containing Hexa for the prevention of damage by wireworms and for the control of wireworms.**] *Biol. Zentralanst. Land-und Forstw. Berlin-Dahlem* 1951, Mitt. No. 70. 113-16, bibl. 12. [Fa. Dr. R. Maag A. G., Dielsdorf-Zürich]

Trials were conducted with barley, maize and sugar-beet. Preparations containing Hexa, applied at a rate which gave 0.6 to 1.2 g. gamma hexachlorocyclohexane per are [100m.^{2}], resulted in a reduction of 25 to 75% in the wireworm population. Control of wireworm by seed treatment is relatively cheap, but not so effective as treatment of the soil before sowing.—D.B.

394 Hanna, R. L. and others. **Results of tests for greenbug control.** *J. econ. Entomol.* 1951, **44**, 347-50, bibl. 1. [Texas Agric. Expt Sta.]

Laboratory trials carried out to test several insecticides on greenbug, *Toxoptera graminum*, infesting barley, showed that Parathion and tetraethyl pyrophosphate were more toxic to this insect than benzene hexachloride. Field trials to control greenbug infesting oats showed that the insecticides tested did not give complete control. Parathion and tetraethyl pyrophosphate probably gave sufficient control to enable predators and parasites, under favourable conditions, to restore the natural balance and prevent another increase of the pest. One field trial indicated that Parathion had greater residual toxicity than tetraethyl pyrophosphate, but the latter compound was less toxic to ladybird beetles, important predators of greenbugs, than Parathion. The degree of control obtained seemed to depend to a large extent on the location of the pests on the plants at the time of treatment. Sprays were more practical than dusts because they could be applied effectively even when the wind was relatively high.—From authors' summary.

395 Piljko, V. M. [**The effectiveness of applying granulated fertilizers to barley, rice and potatoes grown on irrigated land.**] [Russian] *Doklady Vsesojuz. Akad S.-H. Nauk* 1951, **16**, No. 7, 16-18. [Astrakhan Agric. Expt Sta.]

The yield of barley was 2.82 centners per ha greater when superphosphate was applied in granular form than when the powdered form was used. With granulated superphosphate the absolute weight of the barley grain was 45.8 g. with powdered superphosphate 43.15 g. In the experiment with rice, the drilling of granulated superphosphate at the rate of 85 kg. per ha. with the seed was more effective than when powdered superphosphate was applied broadcast at the rat of 250 kg. per ha. Data from an experiment with rice also showed the greater efficiency of granulated superphosphate.—R.P.J.

MAIZE

396 Miège, E. Les céréales en Afrique du Nord. Le maïs et le sorgho. [**The cereals in (French) North Africa. Maize and sorghum.**] *Rev. Bot. appl.* 1951, **31**, 137-58, bibl. in text.

General information is given on maize and sorghum, and the position of these crops in Algeria, Tunisia and Morocco is examined. Maize has a limited importance in the first 2 regions, but in Morocco it is grown for grain or fodder over 500,000 ha., generally without irrigation. The grain yield varies from 3 to 10 q./ha. An account is given of the improvement work done on maize in French North Africa and the best varieties grown there are named. These are mostly early, dwarf, drought-resistant types. As to sorghum, this crop occupies a small area in Algeria and Tunisia and about 150,000 ha. in Morocco. It is mostly grown for grain, its yield being 3 to 7 q. of grain per ha. The varieties grown are named. The area under grain sorghum is decreasing in Morocco in consequence of the increasing area under maize and the development of irrigation. In trials carried out in Morocco with sweet sorghum (*S. vulgare* var. *saccharatum*) for alcohol production, certain Italian varieties performed well, but this cultivation is still very limited.—E.B.

397 Bergamo Stazione Sperimentale di Maiscoltura. Publ. No. 59. Rapporto sulla sperimentazione maidicola 1949. [**Report on the experiments with maize in 1949.**] By *L. Fenaroli*. 1950, pp. 44, bibl. 22, illus.

Information is given on the climatic conditions and adverse factors, mainly dwarfing, which affected maize crops in Italy in 1949, the third year in which hybrid maize was grown. The station controlled directly 27 experimental fields situated in all parts of Italy, on which trials were carried out to study adaptation and productivity. A schematic account of these trials is given, as well as a list of the maize hybrids and varieties tested. About 19,000 q. of hybrid maize seed imported from the USA were distributed to farmers in 1949. Results obtained from this seed are tabulated. While considerable progress has been made in determining suitable hybrids for cultivation in northern Italy, little is yet known in this respect for central-southern Italy and the Italian islands, particularly with regard to non-irrigated cultivation. It was observed that in Italy the vegetative period of the USA maize hybrids is about 10 days longer than in their country of origin. A list is given of maize hybrids and varieties grown in Italy in 1949, which gives the length of the vegetative period in that country. Seed production of hybrid maize in Italy increased in 1949.—E.B.

398 Muhr, G. R. and Rost, C. O. **The effect of population on yields of sweet corn [maize] and field corn.** *Agron. J.* 1951, **43**, 315-19, bibl. 7. [Minnesota Agric. Expt Sta., St. Paul]

Maize was sown under conditions of optimum fertility during a 3-year period in row spacings of 20, 30, 36 and 40 in., with different plant densities per ac., ranging from 9660 to 31,360 per ac. Ear size declined and grain yields increased as plant densities increased, the highest yield of all years being obtained from plants sown in 20 in. rows, with 2 stalks per hill giving a plant density of 31,360 per ac. The average ear weight, 0.36 lb., was lower from this maximum plant density than any of the others used. Yields increased more rapidly with increasing plant densities under conditions of high rather than low fertility.—P.J.B.

399 Pérez Monichón, O. Ensayos chacareros para mejorar la producción de maíz. [**Field trials for improving maize production (in Uruguay).**] *Bol. Inform., Uruguay* 1951, **8**, No. 388, 4.

A series of 4 trials were carried out to demonstrate the effectiveness of thorough cultivation. At the Escuela Granja de Colonia Italia, maize was sown after autumn cultivations of ploughing, cross-ploughing and harrowing in one case; and after ploughing, harrowing, cross-ploughing and 2 harrowings in the second case. A grain yield of 2837 kg. per ha. followed the first treatment and 3600 kg. per ha. the second. Similar results were obtained in the other trials, demonstrating that higher yields followed better working of the land.—N.G.S.

400 Boletín Informativo. Ensayos chacareros para mejorar la producción de maíz. [**Field experiments to improve maize production (in Uruguay).**] *Bol. Inform., Uruguay* 1951, **8**, No. 389, 3.

A cultivation trial was carried out at Pedregal Estate, Departmento de Flores, Uruguay, with the maize variety Cuarentón. Home-grown maize seed was sown on 20 Nov., 1950, at a rate of 10 kg. per ha. with 0.60 cm. [sic !] between rows. Maize cultivated with four ploughings, three harrowings and one cultivation yielded 1468 kg. grain per ha. more (the total grain yield being 3.097 kg. per ha.) than maize cultivated with two ploughings, two harrowings and one cultivation.—N.G.S.

401 Trentin, A. and Rossi, G. Risultanze di una prova sperimentale su 44 tipi di mais ibridi. [**Results from an experimental trial with 44 types of hybrid maize.**] Suppl. *Ann. Sper. agr.* 1951, **5**, 51-61, bibl. 6. English summary p. 61. [Sta. sper. Bieticolt., Rovigo, Italy]

Forty-four American hybrids, some of which were new to the region, were compared in 1950 at the above station with two local varieties, Marano Vicentino and Nostrano dell'Isola. The hybrids proved generally to be well-adapted to the region and to yield more than, in some cases almost double, the local varieties. The late-maturing hybrids were, however, considered unsuitable. The hybrids considered of particular value were: M 2, K L, B M 16, D 17 A, early, and B 45 A, B 56, U 32, Wisconsin 464, K S 6, K R 2, K S 2, Ohio M 34, Ohio M 15, B 73 A, K 3, Indiana 210 B, K T, K O, Funk G 114, of a medium vegetative cycle. The hybrids proved more susceptible to *Pyrausta nubilalis* than the local varieties.—E.B.

402 PISAREV, V. E. and ŽILKINA, M. D. [**Maize in Moscow province.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 9, 17-22. [Inst. Grain Husb. Non-Black Earth Zone]

Results of widespread trials on collective farms indicate that on the heavy soils of Moscow province it is possible for maize varieties of the Siberian early-maturing type to ripen. In southern regions and in regions with light soils and in favourable years, there is a possibility that medium-early varieties like Čišminskaja I or varieties of the Kazan selection will ripen.—R.P.J.

403 LAUMONT, P. Observations sur le maïs hybride et l'intérêt de sa culture en Algérie. [**Observations on hybrid maize and the importance of its cultivation in Algeria.**] *Rev. agric. Afr. N.* 1951, No. 1645, 6, bibl. 2.

Maize cultivation has so far been of limited importance in Algeria. A series of trials began in that country in 1949-50 to compare, mainly under irrigation, 17 maize hybrids from the USA with Jaune L. D., a local variety. Results showed that the grain yield of the hybrids was 27 to 75% higher than that of the control, with the exception of U.22, the earliest of the hybrids, the yield of which was 82% that of the control. In Algeria the length of the vegetative cycle of the early hybrids appeared to be longer and that of the late hybrids to be shorter compared to the length of this cycle in the country of their origin. The hybrids were less susceptible to rust, but more susceptible to stem borers than the control. [See also *Fld Crop Abstr.* 4 : 51]—E.B.

404 TUNISIA, Service Botanique et Agronomique. Bull. No. 18. Les cultures maraîchères en Tunisie. Maïs hybrides. [**Market garden crops in Tunisia. Hybrid maize.**] By *V. A. Novikov.* 1950, pp. 16, bibl. 7.

After having given some results from growing hybrid maize in France and Morocco, a trial is described, carried out by the Service Botanique et Agronomique of Tunisia to compare, under irrigation, 6 maize hybrids from Ontario, Canada, with a local maize variety. The hybrids had a longer vegetative period in Tunisia than in Canada. Wisconsin 275 was the earliest with 109 days. Wisconsin 275 A, Pioneer 355 and Funk Gr. 176 were earlier than the control, which had a vegetative period of 124 days. Canada 545 and Pride D 66 were 8 days later than the control. The yields of the hybrids, namely Pioneer 355, Canada 545, Pride D 66, Funk Gr. 176, Canada 606 and Wisconsin 275 A, compared with the yield of the control as 100, were respectively 173, 172, 159, 140, 102 and 96.—E.B.

405 CHAVAN, V. M. and others. **Hybrid maize for the Gokak Canal Tract in Bombay State [India].** *Indian Fmg* 1950, **11**, 453-5, bibl. 1, illus.

The maize hybrids $I_5 \times 5_{23}$ and $L_5 \times 5_{23}$ gave higher yields than the local maize variety at Arbhavi, Belgaum District, although the increase was statistically significant in one case only. Both the hybrids were obtained from local crosses and the African variety Sahara.—N.G.S.

406 BOSHI SEN. **More trials with hybrid corn [in India].** *Indian Fmg* 1950, **11**, 456-8, illus. [Vivekananda Lab., Almora, Uttar Pradesh]

Results of maize trials at Almora and elsewhere in Uttar Pradesh, also in Bombay, the Punjab and Madras are briefly reviewed.—N.G.S.

407 KERLE, W. D **Maize hybrids and varieties. District recommendations for 1951 sowing.** *Agric. Gaz. N.S.W.* 1951, **62**, 351-5.

An account is given of the best varieties of hybrid and open-pollinated maize for grain production in the various districts of New South Wales.—K.L.

408 WIIDAKAS, W. **Corn [maize] hybrid and variety performance.** *N. Dakota Agric. Exp. Sta. Bimonthly Bull.* 1951, **13**, 157-64. [N. Dakota Agric. Expt Sta., Fargo]

Data are given comparing the yield, lodging and smut percentages and ear height of 18 varieties of hybrid and open-pollinated maize grown at 9 locations in North Dakota during 1944 to 1950. A brief description is given of the varieties used in the tests, together with their relative maturity ratings, which varied from 70 to 102 days.—P.J.B.

409 WORTMAN, L. S. and RINKE, E. H. **Seed corn [maize] injury at various stages of processing and its effect upon cold test performance.** *Agron. J.* 1951, **43**, 299-305, bibl. 19. [Minnesota Univ., St Paul]

Visual determinations were made of the amount and type of physical damage suffered by seed maize in commercial processing. The processing involved picking, husking, drying, shelling, cleaning, grading and mechanical seed treatment. The seed of two hybrid varieties of similar maturity was studied, the first, Minhybrid 408, was sampled at 24 points, the second, Hybrid " B ", was sampled at 30 points. Seed damage increased as processing progressed; only 12 to 13% of Hybrid " B " and 22 to 33% of Minhybrid 408 seed was undamaged at the end of processing. Minhybrid 408 had a larger, heavier kernel with a thicker covering over the germ and was more resistant to seed damage than Hybrid " B ". Shelling appeared to cause the most serious injury to the seed of both varieties. Where the processed seed of both varieties was germinated at 75°F., germination was uniformly high. Under cold-test conditions of germination at 48°F. for 6- and 12-day periods, the germination percentage of the seed of both hybrids was inversely correlated with the degree of seed injury, even where the seed was treated with Arasan SF. Samples of undamaged Hybrid " B " seed germinated much better than did corresponding samples of Minhybrid 408, under the conditions of the 12-day cold test. Open chips or cracks in the germ covering caused the greatest reduction in germination. Closed cracks caused a small but significant reduction in germination, compared with undamaged seed, while injuries to the seed-coat over the horny endosperm caused relatively little reduction in germination.—P.J.B.

410 MILLER, P. A. and BRIMHALL, B. **Factors influencing the oil and protein content of corn [maize] grain.** *Agron. J.* 1951, **7**, 305-11, bibl. 12. [Iowa Agric. Expt Sta., Ames]

Studies were made of the factors affecting, and the relation between, the protein and oil content of the grain of inbred low-oil and high-oil content Illinois maize lines, crosses between these lines and a back-cross of each. The oil content of whole grains varied from 1.33 to 12%, that of the germs varied from 17.17 to 54.23%, and that of the endosperm averaged 0.35 and 1.28% for the low- and high-oil content lines, respectively. Regression values for germ oil and total oil content ndicated that for a 1% increase in total oil, the oil content of the germ increased from between 0.82 o 1%; increases in the total oil content of the rain were almost entirely made up of increases in he oil content of the germ. Variations in the roportion of germ to endosperm appeared to have greater effect on the total oil content of the grain han did variations in the oil content of the germ. t appeared feasible to select strains with increased il content without increasing the oil content of the endosperm to a commercially undesirable extent. Differences between the lines in total protein content were small. The mean protein content of the low-oil and high-oil lines was 14.2 and 12.46% in the whole kernel, 14.73 and 24.47% in the germ and 14.08 and 11.72% in the endosperm, respectively. The strain with the highest content of protein in the germ had the lowest content in the endosperm. The germ portion of the grain was 3 to 4 times richer in tryptophane than the endosperm. It is concluded that the oil content of maize grain can be increased by at least 3% with no losses in yield.—P.J.B.

411 SÁNCHEZ POTES, A. Control de las royas del maiz y del trigo por espolvoreaciones. [**Control of maize and wheat rusts by dusting.**] *Acta Agron.* 1951, **1**, 169-74, bibl. 3.

Studies were made of the effect of sulphur and Fermate (ferric dimethyldithiocarbonate) in controlling *Puccinia sorghi* on maize; also *P. graminis tritici* and *P. triticina* on wheat. Four varieties of maize and five varieties of wheat were used. Sulphur was ineffective in controlling *P. sorghi*, but the effect of Fermate was highly significant. While sulphur gave effective control of *P. graminis tritici* and *P. triticina*, Fermate was much more efficient.—N.G.S.

412 NICOLAS, G. Le charbon du maïs. [**Smut of maize.**] *Rev. Bot. appl.* 1951, **31**, 173-84, bibl. 37.

The conditions which favour the development of *Ustilago maydis* are examined on the basis of literature on the subject and the author's observations on maize crops in France. Possible control measures are discussed.—E.B.

413 TAYLOR, F. **The black maize beetle (*Heteronychus Sanctae-Helenae*). Laboratory tests and field experiments in the Eastern Orange Free State.** *Fmg S. Afr.* 1951, **26**, 299-302.

The cultural and insecticidal control measures described include, (a) ploughing the land when the insects are in the pupal stage, (b) for small-scale infestations, dusting the insects with 4% BHC or treating the soil with 4% BHC at the rate of 50 or 100 lb./ac. and, (c) for field-scale infestations, treating the seed in the planter bins with 20% BHC at the rate of 2 lb. BHC to 25 lb. of maize seed.—K.L.

414 QUESTEL, D. D. and BRADLEY, W. G. **Mortality of aphids and European corn borers feeding on corn plants grown in soil treated with bis (2-(2-fluoroethoxy) ethoxy) methane.** *J. econ. Entomol.* 1951, **44**, 259-60, bibl. 4. [USDA, Bur. Entomol. and Plant Quarant.]

Greenhouse investigations were carried out in Toledo, Ohio, in 1949, to study the mortality of aphids, *Aphis maydis*, and European corn borers, *Pyrausta nubilalis*, infesting maize plants grown in soil treated with bis (2-(2-fluoroethoxy) ethoxy) methane. In one trial, the experimental maize plants, grown in 5 in. flower pots, were heavily infested with aphids. The soil of each pot was treated with 1 cc. of the compound, this quantity corresponding to about 6 lb. of toxic ingredient per acre. Within 72 hours from treatment all the aphids on the plants were destroyed. In other trials, the soil of each pot was treated with 0.25 cc. of the compound. This treatment destroyed 100% of young corn borer larvae placed in contact with the leaves of the maize growing in pots. A slight burning effect on the edges of the maize leaves resulted from the application of the compound to the soil at the rate of 0.25 cc. per 5 in. pot. Maize plants which received a dose of 1 cc. to the soil per 5 in. pot were severely injured.—E.B.

415 Turner, N. **Relation between sugar content of corn and infestation and survival of the European corn borer.** *J. econ. Entomol.* 1951, **44**, 307-9, bibl. 6. [Connecticut Agric. Expt Sta., New Haven]

The relation between sugar content of maize plants and survival of larvae of the European corn borer, *Pyrausta nubilalis*, was studied, (a) in 2 early sweet maize hybrids, Marcross and Washington, selected for test during the 1st generation of the borer, and (b) in the inbred line C103, the 2 single cross hybrids C103 × Oh43 and Oh51A × Oh43, and the late sweet maize hybrid Brookhaven, selected for test during the 2nd generation. The early sweet maize hybrids were infested more in relation to growth stage than to sugar content, Washington, which had the higher sugar content, having no greater survival of larvae than Marcross. As to C103, the 2 single cross hybrids and Brookhaven, which were in stages of growth favourable to the survival of the borers, no relation was found between sugar content and infestation, or between sugar content and survival. The cross Oh51A × Oh43, resistant to the corn borer in the Middle West, had a rate of survival almost as high as Brookhaven. The sugar content of the sap was substantially higher than 5%, which is the amount considered sufficient for the normal growth of the borer.—E.B.

416 Italia Agricola. La piralide del mais. [**Pyralidae on maize.**] *Ital. agric.* 1951, **88**, 564.

The infestation by Pyralidae borers increased in 1951, in all maize-growing districts of Italy, damage being greater in late maize crops. American hybrids are not more susceptible than local varieties. To protect next year's crops, control of Pyralidae should be compulsory. As a control measure, all maize stalks should be cut at soil level and burnt or used for litter.—E.B.

417 Hill, R. E. and Muma, M. H. **Chlorinated chemical control of the sandhill cutworm.** *J. econ. Entomol.* 1951, **44**, 90-2. [Univ. Nebraska, Lincoln]

DDT is more effective than Chlordane, Toxaphene or γ-benzene hexachloride for the control of the sandhill cutworm, *Euxoa detersa*, in maize crops. As little as 1 lb. of DDT per acre, applied as a spray, gives excellent control. Better stands are obtained when treatment is made to the surface of the soil immediately after sowing.—From authors' summary.

418 Roy, D. K. and Guha, B. C. **Sugar in maize stalks.** *Science and Culture* 1951, **17**, 138. [Appl. Chem. Dept, Univ. Coll. Sci. Technol., Calcutta, India]

Fresh, green maize stalks were found to contain 6.4% cane sugar and 1.2% invert sugar (as glucose) on a fresh-weight basis. It is suggested that green maize stalks could be utilized for human consumption.—N.G.S.

419 Josephson, L. M. **Effect of maleic hydrazide in delaying flowering in corn** [**maize**]. *Agron. J.* 1951, **43**, 404-5, bibl. 3. [Kentucky Agric. Expt Sta., Lexington]

Studies were made of the effect of maleic hydrazide on flowering and silk production to determine the possibility of utilizing parents differing widely in their time of flowering for the production of seed maize. Concentrations of 0.2, 0.1 and 0.05% maleic hydrazide as a water soluble diethanolamine salt, with 0.05% wetting agent, were applied to an inbred strain WF9 and a single cross WF9 × 38-11. Methods of treatment used were spraying to the run-off stage and pouring 10 cc. of the solution on to the leaf whorl, just prior to tasselling when WF9 was 2 ft. and WF9 × 38-11 was 3 ft. high. Anthocyanin pigmentation appeared in all the treated plants 2 weeks after the different treatments, the effect being most marked in WF9 following the heaviest rate of application. With WF9, the 0.2 and 0.1% spray treatments killed the plants, while the 0.05% treatment sterilized the plants, but did not delay tasselling, compared with the controls. With WF9 × 39-11, spray treatments with 0.2, 0.1 and 0.05% maleic hydrazide delayed tasselling 15, 2 and 2 days respectively, compared with controls. The 0.2 and 0.1% treatments sterilized the tassels, while the 0.05% treatment resulted in 50% sterility. Applications made just prior to tasselling had little effect on tassel production. Applications of maleic hydrazide to the leaf whorl were much less effective than run-off spray treatments. In all cases, maleic hydrazide reduced grain yields compared with controls. The effect on plant growth of soaking the seed in maleic hydrazide prior to sowing is reported.—P.J.B.

420 South Africa Department of Agriculture. Sci. Bull. 317. **A maize-N-P-K fertilizer experiment, 1931-1937.** By *J. van Garderen* and *W. B. Goldschmidt*. **A break in the phosphate yield-increment curve.** By *J. van Garderen*. 1950-1. pp. 18.

The first part of the report summarizes an experiment to ascertain the response of maize cobs, stover, grain and ensilage to various dressings of superphosphate, muriate of potash and urea. No significant differences in yields were established between any of the potash and nitrogen treatments. In the experiment to test the response of phosphate treatments on maize ensilage, only very heavy dressings (over 1000 lb. superphosphate per morgen) were significantly superior to light treatments. Yields of cobs and stover were increased by 400 lb. of superphosphate per morgen, though only heavy applications (1000 lb. or over) were superior to 200 lb. superphosphate per morgen. For grain, there were no significant differences between applications of from 400 to 1000 lb. superphosphate per morgen. [1 morgen = 2.1165 ac.]—K.L.

421 South Africa Department of Agriculture. Bull. No. 313. **The production cost of maize** [**in South Africa**]. By *J. C. Neethling* and *A. J. Du Plessis*. 1950-1, pp. 26.

MILLET AND SORGHUM

422 Zimmermann, K. Hirse als Körnerfrucht. [**Millet as a grain crop.**] *Dtsch. Landw.* 1951, **2**, 401-2. [Zentralforschungsanstalt für Pflanzenzucht, Müncheberg, Mark]

Millet was widely cultivated in Germany in the Middle Ages, but has since been displaced from arable farming by potatoes in the north of the country and by maize in the south. It is considered that millet can compete with oats and that it has a future in Germany. *Panicum miliaceum* is the only species which could be cultivated and a brief general account is given of the cultivation and harvesting of this crop.—D.B.

423 Haseler, R. E. and Steele, W. G. **Broom millet** [*Sorghum vulgare* var.]. *Qd agric. J.* 1951, **73**, 125-37, illus.

An account is given of the requirements, planting, harvesting, curing and marketing of this non-saccharine type of sorghum. Although the production of broom millet in Queensland is a very minor industry at present, it is likely to increase rapidly with the increasing demand for broom-millet brushes.—K.L.

424 Tarasov, S. [**Selection of millet** (***Panicum miliaceum***) **for cultivation under irrigation.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 8, 26-8. [Ural State Sel. Sta.]

In the extreme South-East of the USSR the best results from millet under irrigation are obtained from late-ripening varieties, with a growing period of about 90 days, which are unsuitable or partly suitable for dry cultivation in those regions. In experiments at the Station, forms of Album, Aureum and Victoria gave the highest yield of good quality grain. Uraljskoe 1419 and Uraljskoe 2622 were particularly high yielding.—R.P.J.

425 Baptist, N. G. **Amino acids in Finger Seed** (**Ragi Kurakkan**) ***Eleusine coracana.*** *Curr. Sci.* 1951, **20**, 268, bibl. 5. [Biochem. Lab., Univ. Ceylon, Colombo, Ceylon]

It was shown that *Eleusine coracana* contains over 0.3% threonine, thus refuting Lal's assertion (*Indian J. Med. Res.* 1950, 38, 131) that *Eleusine coracana* was totally devoid of threonine.—N.G.S.

426 Corriols, J. Quelques observations sur la biologie florale du mil et du sorgho au Sénégal. [**Some observations on the floral biology of millet** (***Pennisetum*** **spp.**) **and sorghum** (***Sorghum*** **spp.**) **in Senegal.**] *Ministère France d'outre mer Bull. agron.* No. 6, 1951, 59-69, bibl. 4, illus.

After a chapter on the systematics of the cultivated species of *Pennisetum* and *Sorghum*, the morphology of the inflorescence and flower and the course of flowering in various species and types of these two genera are described.—E.B.

427 Ferguson, I. A. C. **Sorghum.** *Rhod. agric. J.* 1951, **48**, 276-84, illus. [Dept Agric. S. Rhodesia]

A general, illustrated account of the crop with special reference to its use for S. Rhodesian conditions.—K.L.

428 Bonjour, A. El cultivo de la feterita para grano. [**The cultivation of feterita for grain** (**in Uruguay**).] *Bol. Inform., Uruguay* 1951, **8**, No. 38, 6.

Practical advice is given on the cultivation of feterita (*Sorghum saccharatum*).—N.G.S.

429 Carlson, C. W. and Olson, R. V. **Iron-manganese ratios in nutrient solutions in relation to the chlorosis of sorghum plants.** *Proc. Amer. Soc. Soil Sci.* 1950, **15**, 251-4, bibl. 19. [Kansas Agric. Expt Sta., Manhattan]

Westland sorghum plants were grown in nutrient solutions containing different Fe/Mn ratios varying from 0.013 to 600. The Mn concentrations in the solutions were 3, 0.5 and 0.005 ppm, each combined with 3, 0.5 and 0.04 ppm Fe, and also in an optimum ratio of 2 (3 ppm Fe to 1.5 ppm Mn). The growth of plants receiving 0.04 ppm Fe was poor, irrespective of the Mn concentration. At levels of 0.5 ppm Fe, growth was dependent on Mn concentrations, while the growth of plants receiving 3 ppm Fe was good, irrespective of the Mn concentration. For given concentrations of Fe, the 3 ppm Mn treatment produced less plant growth than the 0.5 and 0.005 ppm treatment, while the 0.5 ppm Mn treatment produced more plant growth than the 0.005 ppm treatment, all the differences being significant. Plants grown in solutions with 3 ppm Fe showed no chlorosis at any stage. Plants grown in low Fe/high Mn, medium Fe/high Mn and medium Fe/medium Mn solutions developed chlorosis 5, 10 and 28 days, respectively, after being placed in the nutrient solutions. The Fe content of the plant sap was not significantly affected by the Fe/Mn ratios of the nutrient solutions, while the Mn content of the sap increased as the Mn concentrations in the solutions increased. The Fe/Mn ratios in the plant sap and dried plant material corresponded to that in the nutrient solutions.—P.J.B.

RICE

430 MIÈGE, E. La question du riz au Maroc. [**The rice question in Morocco.**] *Rev. Bot. appl.* 1951, **31**, 294-312, bibl. in text.

An account is given of the origin and recent development of rice cultivation in Morocco, where this crop now covers approximately 2400 ha. Although rice appears to be successful, the most suitable varieties and appropriate methods of cultivation and manuring have still to be found. Trials in particular are carried out to test new rice varieties. The main conclusions reached in other rice growing countries as to cultivation, sowing, irrigation, manuring, rotation, weeding, varieties, harvesting, adverse factors, malaria, yield, working and economics of rice are reviewed and compared with the results so far obtained in Morocco. At the start of rice growing in this country, transplanting from nurseries was practised, but now direct sowing in dry land is preferred. A satisfactory irrigation method appears to have been evolved and some preliminary conclusions reached on manuring. It is thought that rice should be preferably grown in a rotation, but the choice of the crops which should alternate with rice has not yet been made. The principal adverse factors to rice in Morocco are weeds, lodging and the chergui [a hot, east wind]. [See also *Fld Crop Abstr.* 4 : 367 and 368]—E.B.

431 DOBBY, E. H. G. **The North Kedah plain.** *Econ. Geogr.* 1951, **27**, 287-315, illus.

The Kedah Plain, in northwest Malaya, is described. The area is very flat and agriculture is closely linked to water supplies. The normal cycle of rice growing is outlined. Rice is transplanted from nurseries, which are sown by close broadcasting at a rate of 20 lb. for each acre to be planted out. The roots of seedlings are sometimes soaked in a guano mixture before transplanting. The methods of land clearance and preparation for padi growing in mangrove-, forest- and peaty-swamps are described.—N.G.S.

432 ANNES GONÇALVES, P. Numero de horas de trabalho de um homem em uma quadra de arroz. [**Number of man-hours worked in a quadra (132 sq. m.) of rice (in the USA).**] *Lavoura Arrozeira* 1951, **5**, 15-16. [Inst. Rio Gradense do Arroz, Rio Grande do Sul, Brazil]

Figures are given for the man-hours taken in cultivating and harvesting rice in Arkansas, California, Louisiana and Texas. The figures for California are based on aerial sowing and the time and labour taken in this operation are not accounted for.—N.G.S.

433 RAMNATH, B. **Notes on rice seed bed preparation** [**in Fiji**]. *Agric. J. Fiji* 1950, **21**, 62.

The article deals with : seed selection, preparation and sowing of the seed bed and care of rice after transplanting.—K.L.

434 CHATTOPADHYAYA, S. B. **Effect of treatment of paddy seeds in West Bengal.** *Plant Protect. Bull.* 1950, **1**, No.2-3, 26-7 [Received 1951] [Dept Agric., West Bengal]

Treatment of rice seed with Agrosan G.N. had no effect upon germination, but resulted in increases in the stand, as compared with the control, varying from 29-140%. Seedlings from treated seeds appeared healthier and made better and quicker growth. Seedling diseases were practically absent. —N.G.S.

435 PIACCO, R. Le anomalie da diserbo biochimico. [**Abnormalities (in rice) caused by herbicides.**] *Ital. agric.* 1951, **88**, 517-23, bibl. 1, illus.

The abnormalities described appeared in rice crops treated with 2,4-D in northern Italy. These abnormalities are thought to occur in particular environmental conditions as rice plants normally are not affected by 2,4-D. The first case described occurred in 1949 in a rice field sown with the variety Americano 1600, treated with Agroxone at the end of July, when the temperature exceeded

30°C., at doses of 200 to 1000 g. of active substance per ha. At all the doses employed the rice plants were affected by "colatura" which consists in the presence, on part of the spike, of abnormal flowers which either fall or remain sterile. Untreated control plants were normal. Colatura in rice can also be caused by cold, by using old plants for transplanting and by hereditary predisposition, especially in the variety Vialone gigante and its hybrids. The abnormalities which appeared in 1950 were more widespread, as they were present in a number of rice fields sown with the varieties Americano, Balilla, Maratelli, R.B. and Arborio, treated with different 2,4-D herbicides at low doses. Leaves and spikes were affected, the grain yield was considerably reduced, and the grain quality lowered. The abnormalities in this case were roughly comparable to those which occur when rice plants in the boot stage are damaged by hail, or when old plants are used for transplanting.—E.B.

436 UNITED STATES Department of Agriculture. Fmr's Bull. No. 1854. **Diseases of rice.** By *E. C. Tullis*. 1951 (revised), pp. 16.

Details are given of the symptoms and control of diseases of rice in the USA.—P.J.B.

437 JUILLET, A. and TURQUOIS, J. Rôle de produits anticaries dans le traitement des semences de riz. [**The action of chemical preparations for the control of bunt in the treatment of rice seed.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 29-32.

The experiments were undertaken to ascertain whether certain fungicides had a beneficial effect on rice yields, apart from their fungicidal action. Four different fungicide treatments were given to seed of the rice varieties Balilla and Razza 77. They included: (a) methoxy-ethyl-mercurial silicate (Mercoran) as, (1) a dust at the rates of 0.03, 0.06, 0.09 and 0.12 g. of Hg. per kg. of seed, and (2) methoxy-ethyl-mercurial-chloride as a solution, [rates not given]; (b) a commercial preparation of copper carbonate dust at 1.20 g. Cu. per kg. of seed; (c) a commercial preparation of BHC at 0.60 g. C_6Cl_6 per kg. of seed; and (d) a mixture of an organo-mercurial compound and γHCH applied as a powder at 0.09 g. Hg. and 1.50 g. $C_6H_6Cl_6$ per kg. of seed. Laboratory and field experiments showed that Mercoran dust gave the best results. In the former experiments the dust applied at the rates of 0.09 and 0.12 Hg. per kg. at average sowing temperature (14 to 18°C.) gave 25% increased rate of germination over the controls. Treatment (b) increased rate and amount of germination, but had a toxic effect on the embryo. Treatment (c) increased percentage germination, but the increased growth rate was not maintained. Treatment (d) had no effect on the percentage germination, but it hindered later development. The field trials showed that rice seed treated with 0.06 and 0.09 g. of Mercoran dust per kg. of seed, germinated 72 hours before the control seed and gave 32.6% higher harvested rice yields than the control seed.—K.L.

438 CHEVALIER, A. Une nouvelle espèce d'*Oryza* sauvage de l'Afrique tropicale. [**A new wild species of *Oryza* of tropical Africa.**] *Rev. Bot. appl.* 1951, **31**, 378-82, bibl. 1, illus.

A botanical description is given of *Oryza ubanghensis* found in Ubangi-Shari, French Equatorial Africa.—E.B.

439 SIRCAR, S. M., and SEN, S. P. **Interaction of temperature and daylength on flowering in winter paddy, Rupsail.** *Curr. Sci.* 1951, **20**, 238-9, bibl. 3. [Dept Bot., Univ. Calcutta, Calcutta-19]

The winter rice variety, Rupsail, was sown on 21 Sept., 1947, and 25 Feb., 1948, and subjected to 8 hr. short photoperiods for 6 weeks. The after-sowing temperature conditions and various morphological items were noted. It was inferred that a critical temperature, nearly 90°C., was necessary after anthesis for the setting of grain. The flowering of winter rice varieties is governed by a particular daylength, 11 hr. 13 min. in the case of Rupsail, and not by a particular time of the year. It is concluded that while daylength is the primary external factor responsible for flowering, variations are chiefly due to temperature differences.—N.G.S.

440 DE, P. K. and SULAIMAN, M. **Influence of algal growth in the rice fields on the yield of crop.** *Indian J. Agric. Sci.* 1950, **20**, 327-42, bibl. 1. [Received 1951] [Dacca Univ., Dacca]

Pot experiments over 5 years showed that the presence of algae had little effect on rice yield for the first 2 years, but that there was a progressive increase in yield in the presence of algae, and a progressive decrease in yield in the absence of algae, in the 4th and 5th years.—N.G.S.

441 SIVARAMAN, M. S. **Increasing paddy production in Madras.** *Indian Fmg* (N.S) 1951, **1**, No. 7, 16-18, illus.

This is a popular article advocating the growing of green manure plants on paddy-field bunds. *Glyricidia maculata* is valuable for this purpose. It should be transplanted when its seedlings are 2-3 weeks old in July-September, when the rice is transplanted, every 6 ft. along the bunds. Germination is about 75%. It grows too high to be browsed by stock. Branches may be lopped after the first year, and thereafter it will stand frequent lopping. *Calotropis giganton* is a rapidly growing shrub which can also be grown successfully. *Sesbania speciosa* is outstanding as a green manure for single-crop wet lands. It is transplanted in July-September when its seedlings are 3-4 weeks old. When planted 6 in. apart on the bund in the first crop of paddy it will yield 3-5000 lb. leaves in the second crop of paddy. One acre can provide sufficient green manure for 6 acres. It is drought resistant.—N.G.S.

442 SRIMATHY VANAMALA SATHE and others. **Influence of fertilisers on the thiamine content of rice.** *Sci. and Cult.* 1951, **17**, 134-5, bibl. 6. [Food Technol. Lab., Indian Inst. Sci., Bangalore 3, India]
The effect of NPK, in the form of groundnut cake, superphosphate and potassium sulphate and "leaf manure," on the thiamine content of the rice variety Co26 was studied. There appeared to be a direct relationship between N and the thiamine content. K alone had no effect and the combination of N and P caused the maximum increase.—N.G.S.

443 RAMIAH, K. and others. **A rational method of applying sulphate of ammonia to rice.** *Curr. Sci.* 1951, **20**, 227-8, bibl. 5. [Cent. Rice Res. Inst., Cuttack]
The usual method, in India, of applying sulphate of ammonia to rice by spreading it on the wet soil after transplanting is wasteful. Where rice is sown on dry soil before the monsoon breaks the application of sulphate of ammonia in the plough furrows should prove less wasteful. More efficient results were obtained by making balls of about 1 in. diameter from a dough of sulphate of ammonia with 5-10 times its weight of soil and a little water and placing them 2-3 in. deep between the rice rows after weeding.—N.G.S.

444 MARTINE, — and BOUYER, S. La fumure des rizières à Richard-Toll. Premiers résultats. [**The manuring of rice fields at Richard-Toll (Senegal). Preliminary results.**] *Agron. trop.* 1951, **6**, 370-83.
Of the fertilizers tested on rice at Richard-Toll since 1947, ammonium sulphate only has proved so far to be effective. Although the dose of 200 kg./ha. of ammonium sulphate gave the highest increase in yield, a dose of 150 kg./ha. seems preferable because at higher rates the rice varieties at present grown are given to lodging.—E.B.

GENERAL

445 LAUMONT, P. and ERROUX, J. Quelles variétés de céréales devez-vous semer? [**Which cereal varieties should you sow?**] *Rev. agric. Afr. N.* [n.d.], pp. 12.
An annotated list is given of the varieties of soft wheat, hard wheat, barley and oats suitable for cultivation in the various regions of Algeria.—E.B.

446 ZELENSKIĬ, M. A. [**Addition to the method of seed production of cereal crops.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 9, 69-71. [Kiev Agric. Inst.]
In 1950 experiments were conducted with rye and wheat in which the ears were "topped" during their emergence from the leaf sheath before flowering had begun or in the first few days of flowering. In the first group of plants one-third of the total length of the ear was removed, in the second group one-half, and in the third group two-thirds. On ripening, the plants were harvested separately according to the degree of topping. It was found that topping reduces the yield, but increases the absolute weight of the grain which increases in proportion to the increase in the extent of topping. The seeds from the topped ears were large, well filled and uniform in size.—R.P.J.

447 LAUMONT, P. À propos des semences sélectionnées de céréales. [**Selected cereal seeds.**] *Rev. agric. Afr. N.* 1949, No. 1574, pp. 8. [Received 1951]
An account is given of the development and present situation of the organization for producing selected cereal seed in Algeria. The Service de l'Expérimentation Agricole is at present responsible for this production. Although the quantity of selected cereal seed has rapidly increased in recent years, it is still insufficient to meet demand.—E.B.

448 CAMBRIDGE, National Institute of Agricultural Botany. **Seed Notes No. 38**, March, 1951, pp. 7.
Consideration is given to: (a) cereal seed-crop inspection scheme: Svalöf varieties, (b) the scheme of the Department of Agriculture, Scotland, for inspecting growing oat crops, (c) recommended list of cereals, and (d) cereal seed crop inspection scheme, 1950.—K.L.

449 KISELEVA, E. N. [**The effect of dusting with hexachlorane on the germination of heat-disinfected seed of cereals.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 8, 80. [Gorjkovskaja State Expt Sta. Agric.]
Dusting with hexachlorane of seed of spring wheat, previously disinfected by the heat method, reduced energy of germination and percentage germination, particularly when the moisture content of the soil was high. Dusting with hexachlorane of barley seed previously disinfected with formalin had no depressing effect on field germination.—R.P.J.

450 LAUMONT, P. Le traitement des semences de céréales contre la carie du blé et les charbons couverts des orges et avoines. [**The treatment of cereal seeds against bunt of wheat and covered smut of barley and oats.**] *Rev. agric. Afr. N.* 1949, No. 1575, pp. 3, bibl. 4. [Received 1951]

These diseases cause serious cereal losses in Algeria particularly in native farms. The control measures recommended are: (a) if there are 5 to 10% infected spikes, the seed should be changed; if the infection persists, more resistant varieties should be adopted; (b) if the infection is from 1 to 5%, the wheat seed should be wet treated with a solution of copper sulphate or Bordeaux mixture and the barley and oat seed with a formol solution; (c) with lower percentages of infection, the seed should be dry treated with copper or sulphur powders, the use of organo-mercuric compound being still forbidden in Algeria. If the soil is bunt-infected the stubbles should be burnt and oats or barley grown instead of wheat for several years.—E.B.

451 ENGLAND and WALES, Ministry of Agriculture and Fisheries. Adv. Leafl. 219. **Grain weevils.** 1951, pp. 4.

The weevils discussed are *Calandra granaria*, *C. oryzae*, *Tribolium castaneum* and *T. confusum*. Control measures are described.—K.L.

452 OVČINNIKOV, N. N. [**Regular variation in measurements of pollen within the limits of the spikelet (of cereals).**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 8, 79, bibl. in text. [Kishinev State Univ.]

Tabulated data show that in cereals the average measurements of the length and width of pollen grains taken from different flowers of one and the same spikelet are not equal. In rye and oats the stamens of the first flower in the spikelet contain the largest amount of pollen, as well as the pollen grains with the largest average dimensions.—R.P.J.

453 FORLANI, R. Ibridi di Triticineae resi fertili con colchicina. [**Hybrids of Triticineae made fertile with colchicine.**] *Ann. Sper. agr.* 1951, **5**, 1079-94, bibl. 8, English summary, pp. 1093-4. [Ist. naz. Genet. Cerealicolt. N. Strampelli]

LEGUMES

COWPEA

454 SHERWIN, Helen S. and LEFEBVRE, C. L. **Reaction of cowpea varieties to bacterial canker.** *Plant Dis. Rep.* 1951, **35**, 303-17, bibl. 13. [Forage Crops and Dis. Div., Plant Industry Bur., U.S. Dept Agric.]

Data are given of the resistance of 351 seed lots of cowpea (*Vigna sinensis*) and related species to *Xanthomonas vignicola*. These seed lots included most of the commonly-grown varieties, a number of hybrid selections, a group of introductions not yet identified as to variety and a number of wild, or exotic species, including *V. catjang*, *V. cylindrica*, *V. repens*, *V. sesquepedalis*, *V. triloba*, *V. vexillata*, *V. wilmsii* and some unidentified *Vigna* spp. A number of related genera were also tested, including *Dolichos biflorus*, *D. lablab*, *Otoptera burchelli*, *Phaseolus* sp. *Ph. lunatus* and *Ph. vulgaris*. Among named varieties of cowpea, the following were immune, or highly resistant: Brabham, Buff, Iron, Six-weeks-Ala (SCP. No. 9), Suwannee and Victor. Moderately-resistant varieties were: Brown Crowder, Michigan Favourite, Conch, New Era and Nassau.—P.J.B.

SOYABEAN

455 BLANCHARD, M. Le soja. Son intérêt, ses possibilités culturales en Algérie. [**Soyabean. Its advantages and cultural possibilities in Algeria.**] *Rev. int. Produits colon.* 1950, pp. 7, bibl. 8.

Trials with soyabean, to study its cultural possibilities, started in Algeria about 55 years ago. At the Central Station of Maison-Carrée there is at present a collection of 200 soyabean varieties. A preliminary classification is given of the soyabean varieties grown in Algeria, based on the length of the vegetative period. The requirements of soyabean, as to soil, climate and cultural methods, are briefly described. Soyabean in Algeria must generally be grown under irrigation. If grown for seed, early to medium late varieties are recommended. It is possible to have 2 crops per year with the early varieties. There is an increasing demand for soyabean seed for sowing in Algeria.—E.B.

456 ČERNOBRIVENKO, S. I. [**A valuable new variety of soyabean, Dneprovskaja I.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 9, 36-7. [Ukrainian Sci. Res. Inst. Grain Husb.]

Since 1946, the only variety of soyabean (*Glycine soja*) multiplied at the Station and handed over for production is Dneprovskaja I. This variety gives a higher seed yield than the older regionalized varieties Staroukrainskaja and Harbinskaja III. It is drought-resistant and ripens slightly earlier than the other varieties mentioned. Its seed can be harvested by combine. In the provinces of Zapozhyl, Kirovograd, Odessa, Kiev and Izmail, the average seed yield of Dneprovskaja

I was 11.9 centners (centner = 100 kg.) per ha., while that of the standard variety Staroukrainskaja was 10.6 centners per ha.—R.P.J.

457 TJUGINA, E. I. [**Vegetative hybridization of soya.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 10, 32-6. [All-Union Sci. Res. Inst. Soybean and Castor oil]

In graft hybrids of soyabean (*Glycine soja*) heterosis was observed in the first and second generations: the plants made vigorous growth and surpassed the original forms in yield. Changes can be effected in the year of grafting and transmitted to the progeny.—R.P.J.

458 MCALISTER, D. F. and KROBER, O. A. **Translocations of food reserves from soybean cotyledons and their influence on the development of the plant.** *Plant Physiol.* 1951, **26**, 525-38, bibl. 14, illus. [US Reg. Soybean Lab., Urbana, Illinois]

The following results were obtained in a study of, (a) the changes which occurred in the cotyledons of Lincoln and Earlyana soyabeans from planting to cotyledon senescence, and, (b) the effects of cotyledon removal on development of the plant. Hydration of the cotyledons was complete 4 days after emergence. Total decrease in dry weight of the cotyledons was 70%. One half of this decrease had occurred by emergence. Of the organic reserves, the sugars disappeared most rapidly, only a trace remaining at emergence. Ether-extractable substances decreased to 50% of their original concentration by emergence, to 10% 6 days later and to 4% 28 days after emergence. Proteins decreased throughout the sampling period to 70% at emergence, 25% 9 days later and to a final concentration of 7%. Most of the potassium (69%) and phosphorus (92%) moved out of the cotyledons at about the same rate as the organic reserves. A slight loss in magnesium during germination was followed by an increase which more than made up for the loss (net gain 4%). The calcium content did not change appreciably during germination. In the 28 days after emergence the calcium content of the cotyledons increased 300% over the original concentration. Compared with untreated controls, plants whose cotyledons had been removed at emergence or 2 days later were reduced in height and showed tendencies toward reduction in seed yield. Cotyledon removal later than 4 days after emergence had no effect on plant development. No important differences were observed between the 2 varieties of soyabeans in either translocation of food reserves from the cotyledons or in the effect of cotyledon removal on plant development.—From authors' summary.

GROUNDNUT

459 YORK, E. T. and GODFREY, M. R. **Closer [groundnut] rows pay.** *N. Carolina Res. and Fmg* 1951, **9**, 10 and 15. [N. Carolina Agric. Expt Sta., Raleigh]

Row spacings of 36 in. have been standard with growers of bunch-type groundnuts for many years in N. Carolina, while runner-type groundnuts have been usually grown in 42 in. rows. In 1950 trials, the yield of runner-type groundnuts grown in 36 in. rows averaged 400 lb. per ac. more than those grown in 42 in. rows. It is doubtful whether row spacings of less than 36 in. are suitable for runner-type groundnuts. The yield of bunch-type groundnuts grown in 24 in. rows averaged 658 and 849 lb. per ac. more than that of the same variety grown in 36 and 42 in. rows, respectively. The closer the rows in which the crop was grown, the better the weed control obtained.—P.J.B.

[Close spacing of groundnuts has also been shown to result in a reduction of losses from rosette disease of groundnuts in tropical Africa. See Storey, H. H., Basic Research in Agriculture, *E. Afr. Agric. and For. Res. Organ.* [n.d.], pp. 24. —Ed.]

460 BOUFFIL, F. Qualité des arachides du Sénégal appréciée en fonction de la valeur des semences distribuées par les Sociétés de Prévoyance de 1935 à 1949. [**The quality of groundnuts of Senegal assessed on the value of the seeds distributed by the Sociétés de Prévoyance from 1935 to 1949.**] *Ministère France d'outre mer Bull. agron.* 1951, No. 6, 3-18, illus.

In Senegal, the quality of groundnut seed for distribution by the Sociétés de Prévoyance, is controlled by the Bambey Expt Sta. Seed sampling for analysis, method of analysis and germination tests are described. As a result of the efforts made since 1935 towards increasing the use of selected seed, the quality of groundnuts produced in Senegal has improved. In particular the percentage of fully ripe nuts, which have a high oil content and are the only ones suitable for sowing, has constantly increased.—E.B.

461 BOUFFIL, F. and others. Les terres à arachides du Sénégal. Amélioration des rendements par l'utilisation des engrais verts. [**The groundnut soils of Senegal. Yield improvement by employing green manures.**] *Ministère France d'outre mer. Bull. agron.* 1951, No. 6, 37-40.

Experience acquired at Bambey, Senegal, shows that it is possible to maintain soil fertility and high yields, in an intensive system of groundnut cropping, by employing a green manure in a 3 years' rotation such as groundnuts/millet (*Pennisetum*)/fallow. *Pennisetum* is now preferred to leguminous crops for green manure because it gives a great bulk of green matter and the seed is readily available. Various problems arising from this method are examined. The influence of millet on the yield of the sunflower (grown as a catch crop) and groundnut crops was studied. In the trial described, millet was ploughed under at the beginning of September and sunflower sown on 17 September. Millet had a depressing effect on sunflower yield, but it increased the yield of groundnuts grown in the following year, this increase being 28% for the whole plant and 16% for the pods only. The seed rate of *Pennisetum* for broadcast sowing should be 40 to 50 kg./ha. The best time for ploughing it under has not yet been determined experimentally. This is at present done at the end of August at the beginning of earing. When millet is not completely ploughed under, it sprouts again and provides a soil cover. To reduce the cost of the green manure, the possibility was studied of growing a catch crop, sunflower, after ploughing under the green manure. Results obtained with the sunflower varieties Sunrise and Nain Noir and with a variety from the Niger region were unsatisfactory. Although catch crops are difficult to grow in the Bambey region, where the average rainfall is 600 mm. yearly, the possibility of finding a more suitable sunflower variety, or of employing other catch crops, is being considered.—E.B.

462 SAUGER, L. and THÉVENIN, L. Facteurs de production de l'arachide en fonction de la lignée et du traitement fongicide des semences. [**Factors in production of groundnuts in relation to the strain and the fungicidal treatment of the seeds.**] *Ministère France d'outre mer Bull. agron.* 1951, No. 6, 70-81.

An account is given of the trials carried out at the Centre de Recherches Agronomiques, Bambey, Senegal, to study the different factors which favour groundnut yield; in particular, good sprouting, low mortality during growth and high average yield per plant, in relation to the strain employed and the fungicidal treatment given to the seeds. Three groundnut strains were tested, namely: 24-11, (Baol type, late, creeping); 28-206, (Saloum type, late, erect), and 46-65 Niger, (Saloum type, late, erect). The fungicidal dust employed was SAE 1004, at doses of 1.5, 3 and 10 parts per 1000. The main general conclusions were: (a) the above-mentioned factors of production were shown to vary greatly with the strain; (b) the fungicidal treatment influenced the various factors of production differently in the various strains; the treatment generally improved the percentage of sprouting; (c) the fungicidal treatment did not increase the yield of the strains 24-11 and 46-65 Niger, but it increased the percentage of sprouting, the plant survival at harvest and the plot yield of pods and seeds of the strain 28-206; (d) the treatment at the dose of 1.5 per 1000 was similar to that obtained with higher doses. [See also next Abstract.]—E.B.

463 TOURTE, R. and COLLOT, L. Les parasites de la graine d'arachide. Influence sur la levée. Traitement des semences. [**The parasites of groundnut seed. Influence on sprouting. Seed treatment.**] *Ministère France d'outre mer Bull. agron.* 1951, No. 5, 51-62, illus.

It is calculated that in Senegal during 1949, fungi, bacteria, insects and galley-worms [Myriapoda] caused losses up to 50% in groundnut crops. This figure was confirmed by laboratory tests. Preliminary trials were carried out in 1949 to control these parasites, mainly the fungi, by seed disinfection. The 4 fungicidal powders tested increased the percentage of sprouting in groundnuts. The most effective in this respect was SAE 1004, followed by SAE 1010, Sanigran and Arasan. [See also *Fld Crop Abstr.* 4 : 1048 and 1049]—E.B.

464 MACHMER, J. H. **Root knot of peanut. I. Distribution.** *Plant Dis. Rep.* 1951, **35**, 364-6, bibl. 7. [Georgia Coastal Plain Expt Sta., Tifton]

A brief review is given of the distribution of root knot of groundnut caused by *Meloidogyne hapla* and *M. arenaria* in the USA. Coffee weeds (*Cassia tora* and *C. occidentalis*) occur in certain areas as persistent weeds and are repeatedly found severely infected with root knot in fields of infected groundnuts. Hairy indigo (*Indigofera hirsuta*) is widely used as a root knot resistant rotational crop, but has proved very susceptible to root knot nematode in Georgia trials, as were a number of other legumes, such as clovers, lupins and winter peas. *Crotalaria* spp. and *Desmodium* are immune and serve to reduce infection. Under Georgia conditions, a weed-free *Crotalaria*/oats rotation still appears the most suitable control measure.—P.J.B.

465 MCBETH, C. W. **Observations on repeated applications of D-D (dichloropropene-dichloropropane).** *Plant Dis. Rep.* 1951, **35**, 243-4. [Shell Oil Co., Modesto, Calif.]

Applications of 200 and 400 lb. per ac. of D-D were made for 5 successive years to plots on Fresno sandy loam with a moisture equivalent of 10%. Crops grown on the plots included beans and cowpeas. No root knot nematodes remained on the treated plots after 5 years' treatment, while plants on untreated plots were all heavily infected. Crop yield data are not given, but in all cases, the yield and general appearance of plants on the treated plots were superior to those of the untreated plots, particularly on the plots treated with 400 lb. per ac. of D-D. There were no apparent signs of toxicity in any of the crops tested at any time during the test period, though it was impossible to determine whether or not D-D had a growth-retarding effect on the crops.—P.J.B.

466 JACOBS, W. P. **The growth of peanuts at various diurnal and nocturnal temperatures.** *Science* 1951, **114**, 205-6, bibl. 6. [Biol. Dept, Princeton Univ., Princeton, N.J.]

Groundnuts were sown outdoors in early September and moved into a greenhouse on 2 October, when the mean height of each replicate, from the cotyledonary node to the distal edge of the stipules of the topmost extended leaf, was 1.4 in. All plants were grown under conditions of 8 hr. day length. Groups of 4 plants were placed under the following day and night temperatures: 26 and 30°C.; 26 and 27°C., 18 and 22°C., and 18 and 16°C. The first flowers appeared on plants growing in the 26°C.-day and 30°C.-night temperatures, but by 7 November, the 26°-27°C. plants had an average of 4 gynophores per plant, compared with 1 for the 26-30°C. plants, though the latter showed considerably greater vegetative development than the former. During a 4-month period, no flowers appeared on the 18-16°C. plants. On the 18-22°C. plants, a few flowers with unelongated calyx tubes developed during a 4-month period, but no gynophores formed.—P.J.B.

467 THÉVENIN, L. Anatomie des racines, hypocotyles et tiges d'arachides. Passage des vaisseaux conducteurs à travers ces trois organes. [**Anatomy of the roots, hypocotyls and stems of the groundnut (*Arachis hypogaea*). Passage of the conducting vessels through these three organs.**] *Ministère France d'outre mer Bull. agron.* 1951, No. 6, 46-58, bibl. 5, illus.

A microscopic study carried out on groundnut plants of the creeping, late variety 24-11, Baol type, selected at Bambey, Senegal, showed that the internal structure of the hypocotyl of a young plant is similar to that of the stem, and that it does not vary as the plant ages.—E.B.

468 JACOBS, W. P. **Auxin relationships in an intercalary meristem: further studies on the gynophore of *Arachis hypogaea* L.** *Amer. J. Bot.* 1951, **38**, 307-10, bibl. 15. [Princeton Univ., New Jersey]

[See also *Fld Crop Abstr.* 1: 548] Evidence is presented that auxin is formed in the distal centimetre of the gynophore, that auxin moves with strict basipetal polarity through both the mature tissue of the gynophore and the intercalary meristem. The rate of movement is 9 mm./hr. The inhibiting effect on gynophore elongation of a range of auxin concentrations, coupled with the results of ether-extractions of gynophores before and after ovarian enlargement, indicate that the elongation of the hypogeal gynophore is normally stopped by the inhibitory effect of auxin moving basipetally from the enlarging ovary.—Author's summary.

469 BOUYER, S. and others. Deuxième contribution à l'étude de la fumure des terres à arachide du Sénégal. Effet résiduel des formules NPK sur la deuxième année de culture. [**Second contribution to the study of manuring groundnut soils in Senegal. Residual effect of NPK formulas in the second year of cropping.**] *Agron. trop.* 1951, **6**, 287-93.

NPK manuring given in the first year significantly increased groundnut yields for two consecutive years of cropping. The effect in the first year was due mainly to N and P, and in the second year to P and K. These results are particularly interesting for the following intensive rotation system: groundnuts 2 years/green manure 1 year, in which the fertilizers are applied to groundnuts in the first year.—E.B.

470 ALABAMA Agricultural Experiment Station. Prog. Rep. Serv. No. 48. **Results of lime and gypsum experiments with runner peanuts.** By *F. L. Davis* and *C. A. Brogden.* 1951, pp. 6.

Trials were carried out on an area depleted by continuous cropping with groundnuts since 1932 to determine what manurial treatment was best fitted to restore yields. Groundnut yields ranged from 1500 to 2000 lb. per ac. between the years 1932 to 1936, but from 1944 onwards yields were less than 500 lb. per ac. The manurial treatments tested were: (a) 400 lb. per ac. of 18% superphosphate; (b) 200 lb. per ac. of 60% muriate of potash; (c) 500 lb. per ac. of gypsum; (d) 1 ton per ac. of lime; (e) a mixture per ac. of 5 lb. of borax, 10 lb. zinc sulphate, 10 lb. copper sulphate, 30 lb. manganese sulphate and 100 lb. of magnesium sulphate. The 2-year average yields of untreated plots were below 400 lb. per ac. On plots treated with (b), (a) + (b), (a) + (b) + (c) and (a) + (b) + (d) average yields were 797, 891, 1859 and 1943 lb. per ac. respectively. The use of either lime or gypsum resulted in large improvements in the quality of the groundnuts. Treatment (e) resulted in only small increases in yield. The results indicated the need for adequate K and Ca in the growing of groundnuts, these being the elements most severely depleted in soils by continuous cropping. More than 40 co-operative field trials were also conducted with farmers to determine the effect of lime and gypsum on groundnut yields. The results of these trials indicated that insufficient supplies of available K limited groundnut yields. Available K was necessary for the setting of groundnuts, but Ca was necessary for their further development. Where adequate K, but insufficient Ca, was added to the soil the percentage of light groundnuts harvest was high. The average yield of groundnuts on 12 soils with an exchangeable Ca content of 710 lb., or less, per ac., was increased 240 and 283 lb. per ac. by applications of 400 lb. per ac. of gypsum and 1 ton per ac. of lime respectively. The percentage of light groundnuts in the crop provided a reliable index of the need of lime treatment to soils, high percentages indicating the need of Ca applications. —P.J.B.

471 BOUYER, S. Phosphates et arachide. [**Phosphates and groundnuts.** *Ministère France d'outre mer Bull. agron.* 1951, No. 6, 19-32, bibl. in text.

An account is given of the investigations on groundnut manuring, particularly P manuring, carried out in Senegal by the Centre de Recherches Agronomiques, Bambey. These investigations included laboratory trials, to study the conditions of growth and the mineral nutrition, and manurial trials in the field. Results showed that: (a) P_2O_5 employed alone increased yield significantly; (b) N and K fertilizers employed alone were ineffective; (c) although P_2O_5 is a limiting factor in production, it is also necessary to supply N and K when P_2O_5 is employed at a high rate. [See also Abs. 127 and 467]—E.B.

PEA

472 VOLOSKY, Y. E. Variedades de arvejas para grano seco. [**Varieties of peas** (**in Chile**) **for dry grain.**] *Simiente* 1950, **20**, 34-5.

Brief notes are given on the following Chilean pea varieties. Petit Pois, Serpet Verde, Hilkjema, Arvejón, Raquina, Pereira, Grano de Oro, Naranja, Blanca, Botánica and Amapola (also called Ojo de Perdiz).—N.G.S.

473 THIKEN, J. Beobachtungen über den Anbau von winterharten Erbsen im Roggengemenge. [**Observations on the cultivation of winter-hardy peas in a mixture with rye.**] *Dtsch. Landw.* 1951, **2**, 330. [KL.—Belitz über Bützow/Mecklenburg]

The first winter pea [name not given] which has proved to be sufficiently hardy for North Germany as been produced at Gülzow. It is not suitable or pure cultivation, but is particularly well-dapted for growing mixed with winter rye (3.5 to 4.0 kg. pea per 0.25 ha. rye). Its stalk is thin but strong and about the same height as rye. Its leaves are fine and small. The plant produces a small, sound seed somewhat grey-green in colour. The pea plant promoted the growth of the rye.—D.B.

474 WATSON, R. D. **Method for use of soil fumigants to control root rot and seed decay in peas and beans.** *Plant Dis. Rep.* 1951, **35**, 324-5. [Idaho Agric. Expt Sta., Moscow]

Details are given of an attachment for use with a one-row drill for sowing peas and beans. The attachment enables a soil fumigant to be applied with the seed. In field trials using formaldehyde, a rate of application of 1.5 to 2 gal. per ac. gave the best results with peas and beans, in terms of stand, yield and control of root rots, as compared with controls. In similar trials with a Shell product CBP-55 (technical chlorobromopropene) control of root rots was obtained at rates of application as low as 0.2 gal. per ac. Higher rates up to 2 gal. per ac. gave better control than the 0.2 gal. per ac. rate, without injuring plant stands. No data of yields or plant stands are given. Rates of application were calculated on a 2 ft. row spacing. —P.J.B.

BEAN

475 BALLATORE, G. P. Primi risultati di alcune prove di orientamento sulla jarovizzazione della fava da granella. [**Preliminary results of some vernalization trials with the bean** (***Vicia faba***).] *Ann. Fac. Sci. agr. Univ. Palermo* 1950, **1**, 181-98, bibl. 4, illus.

The trials on the vernalization of *Vicia faba* var. Leonforte carried out at the Institute of Agronomy Palermo University, which were referred to in a previous article by E. Zanini [see *Fld Crop Abstr.* 4 : 797] are extensively described. The bean seeds employed in this trial were soaked in water for 54 hr. One half of them absorbed 133% of their weight of water, and the other half 173%. Part of the seeds were then cold-treated at 3 to 4°C. for 34 days. The vernalized seeds and two lots of controls were sown on 18 November, 1949, on 8 plots of 50 sq. m. each. Seeds of the parasite *Orobanche crenata* had been previously broadcast on the plots. Sprouting of the beans took place 11 to 12 days after sowing. The vernalized beans started to flower on 14 and 15 January, 1950, when the extremes of temperature were 6°C. and 18°C.; the non-vernalized beans started to flower 28 days later. Pod formation in the vernalized plots was also considerably earlier than in the non-vernalized plots. The plants from the seeds which had absorbed 133% water were slightly earlier than those from the seeds which had absorbed

173% water. The yield of green pods from the vernalized beans (133% water) from the first harvest was 54% higher than from the control plots. Further observations were not made because the infestation by *O. crenata*, which develops rapidly when the temperature is 20°C. or more, destroyed practically all the bean plants in a few weeks. These results show that, by employing vernalized bean seed, it is possible in Sicily to obtain a crop of green pods, but not a crop of ripe seed, on land infested by *Orobanche*.—E.B.

OTHER

476 FICCO, N. Contributo alla biologia ed alla coltivazione della cicerchia. [**A contribution to the biology and cultivation of *Lathyrus sativus*.**] *Ann. Fac. Agr. Univ. Bari* 1950, **7**, 259-72, bibl. 14, illus.

Information is given on the geographical area of cultivation, the botanical and agricultural characteristics, the cultural methods, and the soil and climatic requirements of *L. sativus*. It is grown in southern Europe mainly for food, the area under the crop in Italy being 11,465 ha. in 1946. *L. sativus* was grown experimentally in 1949-50 by the Agricultural Department of Bari University when it yielded about 11 q. of grain per ha. It is a crop suitable for poor soils and a dry climate. In southern Italy it is grown in winter as a renovating crop in the rotation. When grown for seed, it is sown in rows 30 to 35 cm. apart at the rate of 80 kg. per ha. Its seeds are toxic to both man and animals when eaten in large quantities, but they lose their toxicity if they are soaked in water for at least 24 hours before cooking.—E.B.

477 CHEVALIER, A. Plantes de couverture pour pays tropicaux. [**Cover crops for the tropics.**] *Rev. Bot. appl.* 1951, **31**, 272-5.

The chief plants considered are *Pueraria javanica* and *Paspalum notatum*. Other leguminous plants for use as cover crops are briefly described.—E.B.

478 TITOV, T. F. [**Perennial lupin as a source of active nodule bacteria.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1951, **16**, No. 6, 29-33. [All-Union Inst. Fert. Agrotech. and Soil Sci.]

Results are reported of trials in which inoculation of lupin seed with nodule bacteria according to different methods was compared. The treatments tested included: the introduction into the plot, before sowing of the lupin seed, of soil in which lupin had been grown; inoculation of the seed with Nitragin; inoculation of the seed with triturated fresh nodules taken from the roots of perennial lupin in the spring; inoculation of the seed with nodules of annual lupin triturated in water, which had been stored dry since the previous autumn. The tests demonstrated the effectiveness of pre-sowing inoculation of lupin seed with nodules obtained from the roots of lupin plants, the employment of fresh nodules from overwintered plants of perennial lupin possessing the advantages of simplicity and ready availability of the inoculating material.—R.P.J.

479 KRESS, H. Untersuchungen über die Bedeutung des Eiweisses der Süsslupinen unter besonderer Berücksichtigung der weissen Süsslupinen (II. Teil). [**The importance of the protein in sweet lupins with particular reference to the white sweet lupin.**] *Dtsch. Landw.* 1951, **2**. [Gülzow-Gustrow, Mecklenburg]

The content of crude fibre, vitamin, lecithin, reducing substances, protein and amino acids, and fats in the flour and meal from seed of *Lupinus luteus*, *L. albus* and *L. angustifolius* are given in tables obtained from various sources.—D.B.

ROOTS

SUGAR-BEET

480 GRAY, F. and VOLK, G. W. **The effect of row widths and spacings on root yields and sucrose percentage in sugar beets.** *Proc. Amer. Soc. Sugar Beet Technol. Eastern U.S. and Canada 1951*, 1951, 37-8. [Ohio Agric. Expt Sta., Columbus]

Sugar-beet was sown on Brookston silty clay loam in row widths of 28 and 35 in. and with spacings between the plants of 4, 8, 12 and 16 in. All plots received a basic application of 1000 lb. per ac. of 3-12-12 (NPK) and 66 lb. N per ac. as a side-dressing on 19 July. Half the plots were not irrigated and half received 10 in. water during the growing season. In all cases, sugar-beet planted in 28 in. rows outyielded that in 35 in. rows. The 4 in. plant-spacings gave the lowest yields on both irrigated and non-irrigated plots. The 12 and 16 in. plant-spacings with 28 in. row-spacings gave the highest yields (27 tons per ac.) on non-irrigated land, while on irrigated land, the 28 in. row-spacing and 8, 12 and 16 in. plant-spacings produced yields of 30, 28 and 30 tons per ac. respectively. On irrigated plots, the average root weight increased from 1.4 lb. for the 4 in. plant-spacing, to 3.6 lb. for the 16 in. plant spacing, and sugar content increased from 15.2 to 16.3%. On non-irrigated plots, respective sugar contents were 15.4, 16.7 15.3 and 15.0% for the 4, 8, 12 and 16 in. plant-spacings in 28 in. row-spacings.—P.J.B.

481 Daniljuk, S. L. [**The influence on productivity of the conditions under which stecklings of sugar-beet are grown.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 9, 64-7. [Udalalov-Ljulinec Expt Sub.-Sta.]

At the Station, the most effective method of manuring mother beets was the application of the basic mineral fertilizers with an increase in the proportion of nitrogen (NPK + N). If any one of the elements of nutrition in the manures which are applied during planting out is increased, this does not increase seed production compared with the basic dose. The growing of some generations of mother beets with full mineral manures containing an increased amount of N improves the quality of the seed and increases the yield of roots for industrial use.—R.P.J.

482 Davis, J. F. **The effect of seed source and spacing in the row on the yield of sugar beets grown on muck soils.** *Proc. Amer. Soc. Sug. Beet Technol. Eastern U.S. and Canada, 1951*, 1951, 117-23, bibl. 11.

Whole, pelleted and segmented seed was planted in rows 28 in. apart and with 8, 12 and 16 in. between plants in the rows. A basal application of 500 lb. per ac. of 0-10-30 (NPK) + 250 lb. of agricultural salt was made. The yields of the whole, pelleted and segmented seed were 14.6, 15.3 and 15.3 tons per ac., respectively. There were no significant differences between yields for the different plant spacings and between stands and the sucrose content of the roots. For muck soils, it is considered that plant spacings should be slightly less than on mineral soils and that good stands are essential to eliminate weed competition.—P.J.B.

483 Thompson, E. G. **Trials of sugar-beet strains.** *Brit. Sug. Beet Rev.* 1951, **20**, 31-4.

These trials were carried out at 18 centres in Great Britain during the last 4 years to test the field performance of every commercial variety which is on sale. The following strains were best for general conditions where bolting was not serious: Klein E (German), Klein E (Sharpes), Hilleshog, Cannell's No. 22, Cannell's No. 937, Garton's C, Dobrovice, Battle's E, Webb's No. 2, and Bush E. In the Northern districts where early sowing was practised, percentage bolting was higher, especially among the varieties Cannell's No. 937, Hilleshog, and Dobrovice. For black fen soils, the varieties recommended were Hilleshog, Klein E (Sharpe's), Webb's No. 2, Cannell's No. 937 and Battle's E.—K.L.

84 Hunter, J. R. and Dexter, S. T. **Some experiments with seed processing for faster germination of sugar beet seeds (*Beta vulgaris* L.).** *Proc. Amer. Soc. Sug. Beet Technol., Eastern U.S. and Canada, 1951*, 1951, 39-44, bibl. 3. [Michigan Agric. Expt Sta., East Lansing]

Studies were made: to determine the effect of soaking followed by drying on the subsequent germination of sugar-beet seed; to study the effect on emergence in the field of sowing soaked wet seed; to devise a method of treating soaked seed so that it could be drilled in a normal manner. Segmented seed was soaked in water for 6 hr. and then air-dried, other lots repeatedly soaked and dried up to 5 times. The germination of repeatedly soaked and dried seed was slightly better than that of untreated controls. Other seed lots soaked for 24, 48, 72 and 96 hr. before drying germinated normally, except in the case of the seed soaked for 96 hr., which had a slightly lower germination percentage than the control seed. In field trials, seed given 2 alternate 6 hr. soaking treatments and sown on 3 May, had slightly higher emergence counts than untreated seed, as determined on 11 May, but on 17 May, there were no differences in the emergence of the 2 lots of seed. The emergence of seed soaked for 2 alternate 6-hr. periods, then soaked for 4 hr. in a solution of $MnSO_4$ and sown while wet, was far superior to that of untreated seed and seed given 2 alternate 6-hr. soaking treatments before being sown dry. This effect was a result of the seed having been sown wet and was not a result of the $MnSO_4$ treatment. The surface of wet seed could be dried sufficiently to permit of normal drilling, by mixing it with dry, powdered vermiculite at the rate of 5 parts of seed to 3 of vermiculite.—P.J.B.

485 Ehrenhardt, H. Untersuchungen über den Einfluss von Hexachlorcyclohexan auf die Keimung von Samen und das Wachstum der Pflanzen. [**The influence of hexachlorocyclohexane on seed germination and plant growth.**] *Biol. Zentralanst. Land-und Forstw. Berlin-Dahlem* 1951, Mitt, No. 70, 93-5. [Inst. Obst-und Gemüsebau, Heidelberg]

Seed of sugar-beet and wheat was under trial. The seed itself was undamaged by gamma-HCH. On the second day of germination, however, symptoms of injury appeared on the root tip and these were followed by damage in the shoot. The injury was severe in both root and shoot. Histological examination of the roots of wheat seedlings showed an aggregation of nuclei near the meristematic zone and a complete absence of the region of elongation.—D.B.

486 Trentin, A. Osservazioni sul trattamento antesemina dei glomeruli di bietola da zucchero con prodotti insetticidi polverulenti a base di esaclorocicloesano. [**Observations on the pre-sowing treatment of sugar-**

beet seed-clusters with insecticidal dusts based on hexachlorocyclohexane.] *Ann. Sper. agr.* 1951, **5**, 1223-40, bibl. 3, English summary pp. 1239-40. [Sta sper. Bieticolt., Rovigo, Italy]

The damage to sugar-beet crops by soil insects in the first stages of growth are particularly serious in certain years and zones in Italy. Laboratory and field trials were carried out in 1950 to test the effect of the following insecticidal dusts applied to sugar-beet seed before sowing: Gex No. 2, 5% HCH, Geogamma, 15% HCH and Agrocide 5, 10% HCH. These preparations were effective against soil insects, but only when the latter were in proximity of the seed. It was proved, however, that they reduce the germination percentage of the seeds and inhibit the development of the plants. These negative effects were negligible with small doses of insecticide, but increased as the quantity of HCH in contact with the seed increased. The dusts adhered better if the seeds were moistened prior to treatment. To control soil insects in sugar-beet crops, it is considered preferable to dust the soil with an insecticide and to harrow it in lightly before sowing.—E.B.

487 HULL, R. **Spoilage of sugar-beet.** *Brit. Sug. Beet Rev.* 1951, **20**, 25-9. [Rothamsted Expt Sta., Harpenden]

An account is given of the various causes (mainly overheating and attacks by fungi, viruses and bacteria) of spoilage of sugar-beet when in the clamp. Ways of preventing damage are described.—K.L.

488 ERNOULD, L. Traitements de la graine de betterave contre les larves de taupin. [**Treatment of (sugar-) beet seed in control of wireworm larvae.**] *Publ. Inst. belge Amél. Better.* 1951, **19**, 189-204, bibl. 1.

Sugar-beet seeds were dusted with two products: A, containing 20% and B, containing 40% of the gamma isomer of hexachlorocyclohexane. Seed dusting with these products at 3 and at 6 parts per thousand protected the seedlings from attack by wireworms. In practice, seed treatment with product A at the rate of 6 parts per thousand is recommended because at this rate toxicity to the plant was either low or non-existent.—D.B.

489 ERNOULD, L. Les possibilités de lutte contre la jaunisse de la betterave. [**The possibilities of controlling virus yellows in beet.**] *Publ. Inst. belge Amél. Better.* 1951, **19**, 71-138, bibl. 153. [Inst. belge Amél. Better., Tirlemont]

The first part of the paper is concerned with the disease itself and its cause. The principal vectors are *Myzus persicae* and *Aphis fabae*. The methods of attacking the disease have been grouped as: the destruction of host plants and breaking of the disease cycle; control of the vectors; cultural measures; and control of the disease by genetical means. The discussion of these four methods consists chiefly of a literature review of experience from other countries.—D.B.

490 ERNOULD. La lutte contre la jaunisse par l'anhydride bis-bis diméthyl amino phosphorique. Résultats d'essais préliminaires sur un champ de betterave sucrière en 1950. [**Control of virus yellows with anhydrous bis-bis dimethyl amino phosphoric acid. Results of preliminary trials on a sugar-beet field in 1950.**] *Publ. Inst. belge Amél. Better.* 1951, **19**, 179-88, bibl. 6. [Inst. belge Amél. Better., Tirlemont]

Results of preliminary trials with two insecticides, Parathion as a dust and Pestox III as a spray, for the control of virus yellows and mosaic disease in sugar-beet have shown that, compared with controls, Parathion (commercial product used at 40 kg./ha.) had no effect on the disease, but that Pestox III was effective, and equally so at both concentrations used (0.33 and 0.55% pure substance).—D.B.

491 ERNOULD, L. La variabilité comparée de betteraves sucrières diploïdes, mâles stériles et tétraploïdes. [**Comparative variability of diploids, sterile male and tetraploid sugar-beets.**] *Publ. Inst. belge Amél. Better.* 1951, **19**, 139-45, bibl. 4. [Inst. belge Amél. Better., Tirlemont]

The variation coefficients of the weight and of the sugar content of tetraploid and sterile male sugar-beets are distinctly less than those of ordinary commercial varieties (diploids). The small variability of tetraploid and sterile male sugar-beet plants can be useful for those researches which require homogeneous material.—From author's summary.

492 WITTWER, S. H. and HANSEN, C. M. **The reduction of storage losses in sugar beets by preharvest foliage sprays of maleic hydrazide.** *Agron. J.* 1951, **43**, 340-1, bibl. 7. [Michigan State Coll., East Lansing]

Preliminary trials showed that spray concentrations ranging from 500 to 5000 ppm of maleic hydrazide applied to sugar-beet at intervals between 6 weeks and 48 hr. of harvesting produced no apparent effects on the yield, size, or sugar content of the roots. Sprays containing not less than 2500 ppm of maleic hydrazide, applied several weeks prior to harvest, completely inhibited sprout and root growth during the subsequent storage of the roots, even where storage temperatures were high. In a further trial, an application of 2500 ppm of maleic hydrazide spray was made to sugar-beet on 5 October. The spray was made up by adding 1 gal. of a 30% water-soluble maleic hydrazide formulation to 100 gal. water containing 1 pint of Triton B—1956, a wetting agent. The crop was harvested, topped and loaded by hand on 25 October. Comparable samples of untreated and treated roots were placed in bins and stored for 35 days. The weight of untreated and treated roots before storage was 10,350 and 11,100 lb., compared with 9380 and 11,020 lb., respectively, after storage. The percentage of total sugar remaining in the untreated and treated roots after storage was 86.94 and 99.28% of the original sugar content before storage. The average temperature within the bin containing the treated roots remained several degrees F. below that of the untreated roots during the storage period.—P.J.B.

493 Price, C. and others. **Some effects of plant growth regulators on bolting and other responses of sugar beet.** *Proc. Amer. Soc. Sug. Beet Technol.* 1950, 130-6, bibl. 5.

Foliage spray applications of 5 ppm, 2,4-D amine salt were made to different plots of sugar-beet, sown on 6 July, 1949, on the following dates: 21 October, 2 December, 28 January and 8 March and an application of 50 ppm 2,4-D was made to an additional plot on 17 September. The varieties used were US22, which bolts readily, and S.L.753, which does not readily bolt. Observations on bolting were made on 11 April. The 2,4-D caused a significant reduction in bolting on all plots, except those treated on 18 March, on which the reduction in bolting in the case of US22 was slightly less than significant, compared with controls. In all cases, the 2,4-D did not prevent, but merely delayed, the onset of bolting. The top and root weight at harvest (7 June) was significantly reduced by the 50 ppm treatment in September and by the 5 ppm treatment in October, compared with controls. The sucrose content of the roots of plants sprayed in October with 5 ppm 2,4-D was not significantly different from that of the controls, while that of the roots of plants sprayed in September with 5 ppm 2,4-D was significantly lower. A number of the plants sprayed showed no apparent response to 2,4-D and will be used for breeding strains resistant to 2,4-D.—P.J.B.

494 Cooke, G. W. **Placement of fertilizers for sugar beet.** *J. agric. Sci.* 1951, **41**, 174-8, bibl. 5. [Rothamsted Expt Sta., Harpenden, Herts.]

Field experiments were undertaken in 1949 to compare the effect on sugar-beet of placed and broadcast granular phosphate-potash fertilizer and to determine whether there was any advantage from broadcasting half the fertilizer and placing half beside the sugar-beet seed. There was no damage to germination or plant establishment from fertilizer placed in bands 2″ to the side and 2″ below the level of the seed. None of the treatments significantly affected the yield of sugar. It is concluded that in districts where sugar-beet is normally grown, there is no case for placing the full dressing of fertilizer beside the seed except that labour is saved. This confirms the results of similar experiments carried out in 1947 and 1948.—From author's summary.

495 Kandy, J. C. and others. **Sodium as a fertilizer and borax for weed control in sugar beet culutre.** *Proc. Amer. Soc. Sug. Beet Technol., Eastern U.S. and Canada, 1951*, 1951, pp. 86-94. [Wisconsin Univ., Madison]

The inclusion of Na in NPK fertilizer increased the root yield and sugar content of sugar-beets compared with controls to which no Na was applied. A yield response to Na took place, even where little, or no, response to K was obtained. The response to Na was greatest at the lowest levels of applied K. The Na and K content of the petioles gave a better index of the Na-K status of the plants than did leaf blade analysis. The application of 40 lb. per ac. of borax, as a 4 in. band on the soil surface above the seed, resulted in weed stand reductions ranging up to 65% and caused a slight rise in root yields.—P.J.B.

496 Chile, Jornadas Agronomicas. [**Agricultural Conference, 1950.**] *Simiente* 1950, **20**, 3-18.

Summaries are given, in Spanish, of the papers read before the Sociedad Agronomica de Chile during the Jornadas Agronomicas held in September, 1950. Most of these papers deal with sugar-beet.—N.G.S.

POTATOES

497 Jameson, H. R. and Tanner, C. C. **Taint in potatoes grown on land treated with crude benzene hexachloride against wireworms.** *J. Sci. Food Agric.* 1951, **2**, 171-5, illus. [Imp. Chem. Industry, Ltd., Jealott's Hill Res. Sta., Bracknell, Berks.]

It is shown that the degree of taint produced in potatoes grown on land treated with crude benzene hexachloride (worked into the soil by normal cultivation methods) is a function of the amount of crude BHC applied per acre and the time elapsing after application. An equation linking degree of taint with these variables is given and summarizes data accumulated over a period of 4 years in numerous trials under varying soil and climatic conditions in England. Potatoes grown after treating land with 4 lb. crude benzene hexachloride per acre for the control of wireworms are likely to be tainted if planting takes place within 18 months of the date of soil treatment; if planting takes place 3 years after soil treatment the crop should be free from taint.—From authors' summary.

FIBRES

COTTON

498 KELLERMANN, J. La culture du coton en Californie. [**Cotton cultivation in California.**] *Cot. Fib. trop.* 1951, **6**, 105-14, bibl. 12, illus.

California took the 4th place for cotton production among the USA states in 1949 when the cotton area totalled 385,200 ha. This area was reduced to 245,600 ha. in 1950 owing to government restrictions. The lint yield of 713 kg./ha. obtained in California in 1949 was far higher than any of the other cotton-growing states. Almost all the Californian cotton is grown in the San Joaquin Valley and it is grown exclusively under irrigation. The climate of the region and the cultural methods employed for cotton are described. Acala 4-42 is the only cotton variety grown in California since 1949. Data of the water requirements of cotton are reported and an account is given of the irrigation trials with cotton on which the irrigation scheme of California was based. It appears that cotton requires approximately 800 to 1000 mm. of water, including pre-sowing irrigation, according to the type of soil.—E.B.

499 ALABAMA Agricultural Experiment Station. Circ. No. 100. **Cotton production practices in the Limestone Valley areas of Alabama.** By *R. W. Robinson.* 1951, pp. 32.

The results are reported of a survey of the Limestone Valley areas of Alabama carried out to obtain information on current cotton production practices and to determine where improvement in current production methods can be made.—P.J.B.

500 PRENTICE, A. N. **Notes on cotton in Sierra Leone.** *Emp. Cott. Gr. Rev.* 1951, **8**, 178-22, bibl. 3.

Although cotton has been grown successfully for many years as a 'backyard' crop for domestic use throughout Sierra Leone, the author is of the opinion that the prospects of developing a larger and more prosperous cotton industry are poor.—K.L.

501 ALGERIA, Gouvernement Général, Inspection Générale et Direction de l'Agriculture. Bull. No. 171. Le cotonnier en Algerie. [**Cotton in Algeria.**] 1951, pp. 71, illus.

The history and present position of the cotton crop in Algeria is described. In 1950, there were 2500 ha. under cotton in the Bone non-irrigated region and 1450 ha. in the western irrigated plains where Orleansville and Perregaux, the main cotton centres, are situated. In the Bone region the American variety Acala Rogers No. 111, moderately resistant to the bollworm *Earias insulana*, is grown. With the development of cotton cultivation it became necessary this year to dust the cotton crops with HCH. This was carried out successfully by aeroplane; dusting by hand gave poor results. In the irrigated areas the variety Pima Orleansville No. 2, resistant to *E. insulana*, is grown, but there is a tendency to replace it with Zagora and Karnac, which are earlier but more susceptible to *E. insulana*. There appear to be great possibilities for developing cotton in Algeria both in the Bone region, where 25,000 ha. at present under natural pastures will be drained and cultivated, and in the western irrigated regions where 50,000 ha. of land are available for growing annual crops. It is thought that cotton could be grown on 20 to 25 thousand ha. in Algeria, with a total annual production of 5 to 6 thousand tons of lint. Cultural methods on irrigated and dry land, rotations and manuring for cotton, the organization of the cotton-growing farms and the control of the principal cotton pests in Algeria are described. *Platyedra gossypiella*, a serious pest in the past, is now controlled. *E. insulana* is present in all the cotton-growing regions and causes serious damage as the varieties now grown are only partially resistant to its attack. Cultural methods reduce its infestation, but direct measures of control are often necessary. The latter consist in destroying the host plants, other than cotton, and dusting the cotton crops with powders containing 20% barium fluosilicate or sodium fluoaluminate at the rate of 20 to 60 kg./ha. according to the stage of growth. *Prodenia litura* and *Laphygma exigua*, which often cause serious damage, are controlled in the vagrant stage with baits made of bran and sodium fluosilicate or HCH. Some Egyptian cotton varieties are employed for their resistance to *Creontiades pallidus*.—E.B.

502 CHEVALIER, A. Le cotonnier en terrain non irrigué et irrigué en A.O.F. [**Cotton on non-irrigated and irrigated land in French West Africa.**] *Rev. Bot. appl.* 1951, **31**, 319-20.

It is explained why non-irrigated cotton cultivation has decreased considerably in French West Africa while it has increased in French Equatorial Africa. Information is given on the species and varieties of cotton grown in French West Africa.—E.B.

503 CHEVALIER, A. La culture du cotonnier au Congo belge et en Afrique Equatoriale Française. [**Cotton cultivation in the Belgian Congo and French Equatorial Africa.**] *Rev. Bot. appl.* 1951, **31**, 275-9.

A brief account is given of the development and present situation of cotton cultivation in these regions.—E.B.

504 GUILLEMET, P. La production cotonnière en Oubangui-Chari. Campagne 1949-1950 et perspectives d'accroissement. [**Cotton production in the Ubangi-Shari (French Equatorial Africa). The 1949-1950 harvest year and prospects of an increase.**] *Cot. Fib. trop.* 1951, **6**, 115-24, illus.

The 1949-50 harvest year in the Ubangi-Shari is examined in detail and compared with the previous harvest year. The total production of over 36 million kg. of seed cotton in 1949-50 was the highest since the 1940-41 harvest, showing an increase of almost 8% over the average of the 9 previous years. The area under cotton was 125,000 ha. in 1949-50. Triumph Big Boll was the variety grown. It is hoped that, mainly by improvements in the field of phytopathology and genetics, it will be possible to reach the annual target of 60 million kg. of seed cotton.—E.B.

505 SOKOLOVA, N. F. [**The part played by foliage in relation to the yield of cotton.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **75**, 307-10, bibl. 6. [Azerbaïdjan Sci. Res. Inst. Cott. Cultiv.]

Too early removal of cotton leaves before mechanical harvesting of the crop leads to a marked reduction in the yield of the plant. The best time for conducting defoliation is from 20 to 30 September. —R.P.J.

506 BELGIAN CONGO, Institut National Étude Agronomique. INÉAC Ser. Sci. No. 49. Observations sur les réactions du cotonnier aux conditions de milieu. [**Observations on the reactions of cotton to environmental conditions.**] By *M. Lecomte* and others. Bruxelles, 1951, pp. 55, bibl. 23, illus.

A series of trials was carried out at Bambesa station, Uele, Belgian Congo, to study the reactions of cotton to different soil and climatic conditions. A first account of these trials was given by P. Corcelle [see *Fld Crop Abstr.* 4 : 1072]. The influence of environment was studied with regard to seed germination, plant height, roots, stem, branches, leaves, flowers, bolls, plant density at harvest and yield. Although the results obtained are not considered as final, they confirm as a whole those obtained in other countries. Many of the conclusions reached are applicable for conditions in the Uele region. Among the conclusions reached are the following : (a) seed germination is influenced more by the texture and water content of the soil than by soil fertility ; (b) in the Uele region cotton seeds age very quickly, especially after June and July, which are very wet months ; (c) the critical period for boll formation in this region is October.—E.B.

507 HUTCHINSON, J. B. **Intra-specific differentiation in *Gossypium hirsutum*.** *Heredity* 1951, **5**, 161-93, bibl. 28. [Emp. Cott. Gr. Corp., Cott. Res. Sta., Namulonge, Uganda]

An account is given of investigations on the 7 races of *G. hirsutum* recently collected from Central America. The races are : *G. hirsutum* races *morrilli*, *richmondi*, *palmeri*, *punctatum*, *yucatanense*, *marie-galante*, and *latifolium*.—K.L.

508 FARMING IN SOUTH AFRICA. **Cotton insects. Recommendations for the 1951-52 season.** *Fmg S. Afr.* 1951, **26**, 278-81.

Recommendations are made regarding the best time to sow cotton in the 1951/52 season. The most efficient brands of insecticides to use against the red bollworm [*Diparopsis castanea*] and the spiny bollworm [*Earias* sp.] and methods of applying them are discussed.—K.L.

509 GAINES, J. C. and others. **Trials of insecticides for control of cotton insects during 1950.** *J. econ. Entomol.* 1951, **44**, 367-72, bibl. 3, [Texas Agric. Expt Sta., College Station]

In a split-plot randomized block experiment Toxaphene, Aldrin and Dieldrin proved more effective used as sprays than as dusts for the control of thrips, *Frankliniella tritici*, on cotton. Aldrin and Dieldrin sprays, at rates of 0.08 and 0.09 lb. per acre respectively, were more effective than Toxaphene applied at 0.73 lb. per acre. Dieldrin showed more residual toxicity than either Aldrin or Toxaphene. In another split-plot randomized block experiment, Toxaphene, Toxaphene-DDT and γ benzene hexachloride-DDT, dusts, proved equally effective for the control of boll weevil, *Anthonomus grandis*, and bollworm, *Heliothis armigera*. The spray formulation of Toxaphene-DDT was as effective as the dusts. Toxaphene and γ benzene hexachloride-DDT sprays were not as effective as the Toxaphene-DDT spray or the Toxaphene dust. In a randomized block experiment in which heavy bollworm injury occurred, Toxaphene and 3-5-40 dusts were equally effective and both dusts gave significantly better control than Dieldrin dust, Dieldrin spray, Toxaphene spray or Aldrin spray. In the large plots results comparable with those of the small replicated plots were obtained. The results from the 4 tests, with plots ranging in size from 1 to 40 acres, indicated that sprays applied either with a tractor or an aeroplane were effective for boll weevil and bollworm control. In the tests, 6 to 12 applications were required and average net gains in yields over the control plots ranged from 672 to 1223 lb. of seed cotton per acre. When comparing several organic sulphur compounds for the control of spider mite, *Septanychus texazona*, by employing both ground machine and aeroplane to apply the sprays, the ground machine applications proved more effective than the aeroplane applications and Aramite more effective than the other preparations.—From authors' summary.

510 GALLO, D. Principais pragas do algodoerio e seu combate com inseticidas modernos. [**Principal cotton pests (in Brazil) and their control with modern insecticides.**] *Rev. Agric. Piracicaba* 1951, **26**, 331-8, bibl. 8.

The pests considered are grubs [scientific name not given], *Gasterocercodes brasiliensis*, *Alabama argillacea*, *Platyedra gossypiella* and *Horcias nobilellus*. Control may be obtained by using different concentrations of BHC, DDT, Toxaphene, Rhodatox and nicotine sulphate [at unspecified rates] according to the pest involved.—N.G.S.

511 FENTON, F. A. **The fruiting of cotton in relation to insect control: second report.** *Proc. Okla. Acad. Sci.* 1949, **30**, 56-9, bibl. 8. [Oklahoma A. and M. Coll., Stillwater]

It is suggested that the greatest benefit from the application of insecticides to cotton results from the treatment of the crop in the early part of the plant's flowering period. A much higher proportion of first blooms produce bolls than do late blooms, emphasizing the importance of destroying the overwintered boll weevils which destroy the squares that produce early blooms.—P.J.B.

512 WILLE, J. E. **Biological control of certain cotton insects and the application of new organic insecticides in Peru.** *J. econ. Entomol.* 1951, **44**, 13-18, bibl. 5. [Cent. Nac. Invest. Expt Agric. de la Molina, Lima, Peru]

In the years 1946-9 it was observed in Peru that treatment of cotton crops with DDT, benzene hexachloride and Toxaphene caused a heavy increase of the lesser cotton-bollworm, *Heliothis virescens*, and other cotton pests, the reason being that the insecticides destroyed the natural enemies of the pests, the *H. virescens* larvae being destroyed to a lesser degree. In the 1949-50 cotton campaign in 6 valleys of the Central Coast of Peru, where the cotton variety Tanguis is grown, when treatment with insecticides was suspended, *H. virescens* was controlled by its natural enemies. This control was encouraged by restricting irrigation so that succulent leaves and stems of the cotton, which are preferred by *H. virescens*, did not form; also by growing maize between the cotton rows, a practice which favours the development of the natural enemies of *H. virescens* at the beginning of the season. Cotton yield in these valleys in 1949-50 was about 20% higher than in a normal year and 40% higher than in the previous campaign.—E.B.

513 HANNA, R. L. and GAINES, J. C. **Lime-free calcium arsenate mixed with organic insecticides for cotton insect control.** *J. econ. Entomol.* 1951, **44**, 430-2, bibl. 4. [Texas Agric. Expt Sta.]

The results of 3 seasons' trials, carried out on experimental cotton plots in the Brazos River valley, near College Station, Texas, indicated: (a) that lime-free calcium arsenate plus 1% γ benzene hexachloride or 0.5% Parathion is at least as good as any insecticide in general use for controlling boll weevil, *Anthonomus grandis*; (b) that, except in extreme cases, the above-mentioned percentages of benzene hexachloride or Parathion will prevent the development of aphids, *Aphis gossypii*, on cotton crops treated with these mixtures; and (c) that the addition of as much as 2.5% DDT to these mixtures gives excellent control of bollworm, *Heliothis armigera*.—E.B.

514 QUEENSLAND Department of Agriculture and Stock, Division of Plant Industry. Bull. No. 55. **The cotton jassid problem in Queensland.** By *A. W. S. May*. 1950, pp. 19.

The cotton jassid (*Empoasca maculata*) affecting American Upland varieties of cotton grown in Queensland is shown to differ from the more important species affecting cotton elsewhere in that it restricts its activity to the terminal growth of the plant. Soil condition, cultural treatment, time of planting, and variety of cotton are shown to influence plant susceptibility to jassid injury. The breeding of jassid-resistant varieties of cotton is stated to be the only control measure which is likely to be practicable.—Author's summary.

515 ARKANSAS Agricultural Experiment Station. Bull. 496. **Control of the boll weevil and the cotton aphid in Arkansas.** By *D. Isely*. 1950, pp. 42.

Good control of boll weevil (*Anthonomus grandis*) was obtained by applications of 8 to 10 lb. per ac. of calcium arsenate, or 10 to 12 lb. per ac. of either 20% Toxaphene or 3-5-40 (a mixture of 3% gamma isomer BHC, 5% DDT and 40% sulphur). The use of calcium arsenate, alone, tended to build up aphid (*Aphis gossypii*) populations, but when combined with 3% nicotine, was effective against aphid, though not so effective as the BHC in 3-5-40. Toxaphene tended to suppress the development of aphid colonies. Adequate coverage of the plants with insecticides and correct timing of treatment was essential. Recommendations are given for spot dusting, the trapping of weevils in early-sown cotton and weevil control during winter.—P.J.B.

516 WEATHERLEY, P. E. **Studies in the water relations of the cotton plant. 2. Diurnal and seasonal variations in relative turgidity and environmental factors.** *New Phytol.* 1951, **50**, 36-51. [Bot. Dept, Univ. Nottingham]

Water deficits were followed by measuring the relative turgidity of the leaf tissues using the methods outlined in the first paper (*New Phytol.* 49 : 81). A comparison of fluctuations in soil-moisture and meteorological conditions with fluctuations in relative turgidity in the cotton plants was made in two main experiments through two seasons (1945-7). From the data obtained in these experiments definite correlations were established indicating the way in which the water balance of the plants was controlled by the environment. Perhaps the most important fact which emerges from these data is the existence of a critical soil-moisture content which made it possible to assess the relative importance of fluctuations in soil moisture and atmospheric humidity on the water economy of the plants. As long as the soil-moisture content remained above the critical value, the relative turgidity was affected solely by atmospheric conditions. However, soil-moisture content became a controlling factor when it fell below this value. If the existence of this critical soil-moisture content were confirmed for cotton, and its applicability extended to other species and soils, it could become an important soil-moisture 'constant' in crop ecology. It might be characteristic of the species as well as the soil type and reflect an interrelationship between the two.—From author's introduction and discussion.

517 MCILRATH, W. J. and others. **Persistence of 2,4-D stimulus in cotton plants with reference to its transmission to the seed.** *Bot. Gaz.* 1951, **112**, 511-18, bibl. 12. [Texas Agric. Expt Sta. and Bur. Plant Industry, College Station, Texas]

50-day-old cotton plants were treated with the odium salt of 2,4-D in acid-equivalent amounts of 0.1, 1.0, or 10.0 mg. to determine the effect of arge amounts of 2,4-D on (a) translocation of the timulus into seed embryos formed prior to application, and (b) its persistence within the plant as hown by injury to embryos subsequently formed. Cotton plants at the developmental stages of eedling, floral primordia, and anthesis were also reated with 2,4-D acid-equivalent amounts of .01 and 0.04 mg. to determine the effect of plant ge on the transmission of the 2,4-D stimulus into seeds developed subsequent to the application. All seeds from bolls (1-15 days old) set prior to treatment with 0.1 mg. or 1.0 mg. produced seedngs which exhibited symptoms of 2,4-D injury. Bolls in the 10.0 mg. series failed to develop. Some seedlings from seeds produced in bolls initiated 8 weeks after application in the 0.1.-1.0-, and 10.0-mg. series exhibited 2,4-D injury. Seeds formed 14 weeks after application did not yield malformed seedlings in any series. Plants treated with 0.01 or 0.04 mg. of 2,4-D at the seedling or floral primordia stage showed no significant transmission of the stimulus into the seed embryos. Seed embryos formed in bolls initiated in a 5-week period subsequent to application at the anthesis stage showed significant 2,4-D injury. A discussion is presented of some factors determining whether cotton seed embryos formed subsequent to application will be injured by the 2,4-D stimulus. —Authors' summary.

518 BAIRD, G. B. and MEHLICH, A. **The effect of soil exchangeable cations on swiss chard and cotton.** *Proc. Amer. Soc. Soil Sci.* 1950, **15**, 201-5, bibl. 12. [N. Carolina Agric. Expt Sta., Raleigh]

The effect of exchangeable Ca, Ba, Sr, Mg, K, Na, NH_4 and H ions on the growth and mineral content of cotton was studied in greenhouse pot cultures. The degree of Ca saturation of the soils ranged from 10 to 8%, the remainder being taken up by one of the other complementary ions in each case. At the highest level of Ca saturation, there were only slight differences in the growth of cotton, irrespective of the complementary ion. At the lowest level of Ca concentration, cotton failed to grow where the complementary ion was Ba, H, Na, Sr or K. As the degree of Ca saturation increased and the complementary ion content of the soil decreased, the Ca content of the cotton increased and the content of the complementary ion decreased.—From authors' summary.

519 LUNT, O. R. and NELSON, W. L. **Studies on the value of sodium in the mineral nutrition of cotton.** *Proc. Amer. Soc. Soil Sci.* 1950, **15**, 195-200, bibl. 29. [N. Carolina Agric. Expt Sta., Raleigh]

Cotton plants were grown in sand-culture media to study the effect of Na on the yield of cotton under conditions of adequate and deficient K and also the effect of Na on transpiration losses, the oil content of the seed and the chemical composition of the plant. Where the culture was very deficient in K, Na did not delay the appearance of the symptoms of K-deficiency more than 2 to 3 days, but where the cotton was grown in solutions slightly deficient in K, K-deficiency symptoms did not appear before 2 weeks after the Na treatment. From the results obtained, it is not thought likely that ordinary applications of K or Na affect transpiration losses in the field. Only at levels of 0.75 and 1.00 m.e. K in the substrate were significant seed cotton yield responses obtained from Na applications (up to 25% increases), compared with controls. The optimum effectiveness of Na in increasing yields was obtained only when a considerable proportion of the K needs of the plants were satisfied. Na significantly increased the number of bolls retained per plant, where the plants were deficient in K, but not where the plants had adequate supplies of K. The nutritional reserves of plants deficient in K and receiving no Na, were considerably lower during the period 3 to 4 weeks after the start of flowering, than where the plants received Na. Na applications resulted in no significant increase in the weight of the bolls of K-deficient cotton, but at very deficient levels of K, the average boll size was increased almost 50% by K treatment. Increases in the supply of Na increased the breaking strength of the fibre, but decreased the upper-half mean length. Increasing the supply of both K and Na tended to increase the oil content of the seed. N had little effect on the K uptake of the plants, except where the K/Na ratio was very wide and in the mature plants; here the addition of Na reduced K uptake. Na did not affect the accumulation of Ca in the young roots, but reduced the Ca content of the tops and seed and that of mature roots. Na also decreased the Mg content of the roots and mature tops. Increases in K supply decreased Na uptake and reduced the Ca and Mg content of the tops, but not the roots.—P.J.B.

520 COTON ET FIBRES TROPICALES. L'activité de l'IRCT pendant la campagne 1949-1950. [**The work of the Institut de Recherches du Coton et des Textiles exotiques in 1949-50.**] *Cot. Fib. trop.* 1951, **6**, 1-44, illus.

This report gives an account of the work of the IRCT in France, North Africa, French West Africa, French Equatorial Africa and Madagascar. Research was directed mainly to cotton and an outline is presented of work on selection, hybridization, multiplication, varietal and cultural trials, etc., with this crop. At the Centre for Agronomic Research at Rabat, Morocco, the improvement of the variety Pima 67 continued; sowing in twin rows gave better results than sowing in single rows; a density of 100,000 plants per ha. gave the highest yield. In French West Africa, the variety N'Kourala proved superior to local varieties; N'Kourala was resistant, and Togo Sea Island very susceptible, to jassids and leaf-curl; N'Kourala 4307 is one of the best strains so far obtained. In French Equatorial Africa, N'Kourala proved resistant to bacteriosis; N'Kourala 42-5 was the highest yielding strain in south Chad; Triumph D.61 E3, a new strain which is high-yielding and resistant to jassids, is considered suitable for cultivation in the eastern part of the Ubangi; in the Tikem region of Chad measures have been taken to control *Diparopsis* by means of resistant varieties and bait-plants. The IRCT has also carried out research in various countries on other fibre plants besides cotton, mainly flax, hemp and ramie.—E.B.

FLAX

521 REMUSSI, C. Las plantas textiles en la Argentina. [**Fibre plants in Argentina.**] *Rev. Argent. Agron.* 1951, **18**, 154-70, bibl. 14.

The fibre plants of Argentina are reviewed. Flax is particularly susceptible to disease, but Mapun M.A. and Achay M.A. are disease resistant, and Calchaqui M.A.G., which is completely resistant to *Fusarium lini*, immune to the 2 most widespread races of rust and moderately resistant to pasmo, is being multiplied for release. The 2 double-purpose flax varieties H.28 (Ranquel M.A.G.) and H.131 have been bred by Pergamino Experimental Station to provide flax fibre and linseed oil. Notes are also given on hemp, ramie, jute, *Phormium tenax*, *Agave* spp., Bromeliaceae, *Trithrinax campestris*, *Hibiscus* spp., *Crotalaria juncea*, *Urena lobata*, *Sida* spp., and a few other minor fibre species.—N.G.S.

522 MARCIOTTE, C. V. and ACOSTA, P. P. Determinacion de la relacion entre el diametro del tallo y porcentaje de fibra numero de fibrillas en un lino textil. [**Determination of the relationship between the diameter of the stem and percentage of fibre and the number of fibres in flax.**] *Rev. Invest. Agric.* 1950, **4**, 403-8, bibl. 7, illus. [Esta. Expt Pergamino, Argentina]

In an experiment using 189 stems of the flax variety Achay M.A., no correlation was found between the diameter of the stem and the percentage of fibre. For practical purposes, the increase in the number of fibres is constant for equal increases in stem diameter.—N.G.S.

523 LONERAGAN, J. F. **The effect of applied phosphate on the uptake of zinc by flax.** *Aust. J. sci. Res.* Ser. B. 1951, **4**, 108-14, bibl. 16. [Inst. Agric., Univ. West. Aust., Nedlands]

In order to obtain information on the above subject, 6 treatments consisting of the addition of phosphorous with or without zinc were given to flax plants growing in pots containing Kojonup gravelly sand. Marked growth increases due to phosphate and zinc treatments were apparent. Symptoms of zinc deficiency appeared after 4 weeks in high phosphate treatments and quickly spread to all phosphate treatments within 6 weeks, after which recovery of the plants began. The degree of severity of zinc deficiency symptoms and the extent of the response to zinc treatment increased with the level of phosphate application. While phosphorous content increased, relative and absolute zinc contents were significantly reduced at all harvests of plants with increasing phosphate application.—K.L.

HEMP

524 CROCIONI, A. Durata del potere germinativo del seme di canapa in rapporto alle condizioni di conservazione. [**Duration of the germination power in hemp seed in relation to storage conditions.**] *Centro Studi Ric. sulla Lavoraz, Coltivaz. e Econ. d. Canapa Quad.* No. 9, 1950, pp. 0, bibl. 1, illus. [Ist. Agron. Univ. Bologna, Italy]

Hemp seed, like all other oil seeds, soon loses its germination power. An investigation was carried out at the above Institute on hemp seeds of the Carmagnola variety to determine the influence of seed moisture, temperature, air and light on the duration of their germination power. The results of these trials, which continued until the seeds were 3.5 years old, were as follows: (a) under suitable conditions the seeds maintained their germination power and germination energy for the 3.5 years of the trial; (b) seed moisture and temperature were the most important factors, while the effect of different availabilities of air, and of diffused light, instead of darkness, was uncertain; (c) a low temperature of a few degrees above 0°C. and a low seed-moisture content, up to 8.6%, were the best conditions for preserving the germination power; (d) the duration of germinability in seeds of 10 to 15% moisture content kept at higher temperatures was short; (e) a satisfactory germination power was maintained for a period of about 16 months with seeds stored at low temperature, whatever their degree of moisture, and with seeds of about 8% moisture content stored at temperatures not exceeding 27°C.; (f) if the period of storage was longer, high temperature or high seed moisture unfavourably affected the germinability; a seed moisture of about 6% ensured a longer germinability in such cases than did a low temperature; (g) germination energy and germination power appeared to be correlated.—E.B.

JUTE

525 PEREVERZEV, G. A. [**New varieties of jute.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 7, 79-80.

Compared with earlier varieties, the new varieties .64, 028 and 065 bred at the Uzbek Experiment Station of the Bast Institute and released in 1950 give 12 to 29% greater stem length, 10 to 16% higher stem yield, and 14 to 18% higher fibre yield.—R.P.J.

526 NIRMAL KUMAR SEN and JIBAN KUMAR CHAKRAVARTI. **A new sterol from jute seed.** *Sci. and Cult.* 1951, **17**, 135, bibl. 1. [Dept Chem., Presidency Coll., Calcutta, India]

Details are given of a new sterol, which was isolated from the unsaponified portion of the oil derived from *Corchorus capsularis* seed.—N.G.S.

OTHER

527 CHEVALIER, A. Plantes à fibres exploitées au Congo belge et dans le bassin du Niari (A.E.F.). [**Fibre plants employed in the Belgian Congo and the Niari basin (French Equatorial Africa).**] *Rev. Bot. appl.* 1951, **31**, 441-4.

Brief information is given on various fibre plants among which are *Urena lobata* and *Hibiscus cannabinus*, *Triumfetta* spp., *Kosteletzkya chevalieri* and *Honckenya ficifolia*.—E.B.

GENERAL

528 KEARNEY, T. H. **The American genera of Malvaceae.** *Amer. Midl. Nat.* 1951, **46**, 93-131, bibl. 91. [California Acad. Sci., Golden Gate Park, San Francisco]

This is a synopsis of the Malvaceae as now known to exist in North and South America. Among the 56 genera considered are *Gossypium*, *Hibiscus*, *Malva* and *Urena*.—E.B.

OIL CROPS

LINSEED

529 CRUICKSHANK, I. A. M. **Resistance of linseed and linen flax varieties to flax rust (*Melampsora lini*) in New Zealand. Part 1.** *N.Z. J. Sci. Technol.* 1950, **31**, No. 6, 54-7, bibl. 4. [Dept Sci. Industr. Res. Christchurch, N.Z.]

The rust was first recorded on linen flax (*Linum usitatissimum*) in New Zealand during 1927. Since that time the disease has persisted in crops each year and in 1947-8 a flax-rust epiphytotic was experienced. New flax varieties have been introduced into New Zealand to improve the position and this paper gives an account of results obtained in Auckland from testing the introduced and locally grown varieties of linseed and linen flax. In the linseed group Sheyenne, Punjab, and Golden Viking were resistant, while Koto, Moose, Victory, Walsh, Minerva, Redwing, Registered Royal, Royal, Bison, Golden Indian, and Indian showed moderate to high degrees of susceptibility. Of the linen-flax group, three Russian varieties (Stakhanovetz, D-83, and 806/3), Wada, Cascade, and Argentine II were resistant, while Liral Crown was susceptible.—M.H.

530 SORENSEN, J. W. and DAVENPORT, M. G. **Drying and storage of flaxseed in Texas.** *Agric. Engng, St. Joseph, Mich.* 1951, **32**, 379-82. [Texas Agric. Expt Sta., College Station]

The results are given of one year's work at the Beeville Station, Texas, in developing economical methods of drying and storing linseed on the farm. An experimental batch-type drier was designed, with a capacity of 78 bu. The drying-unit consisted of two vertical containers 6 ft. high, 9 ft. long and 10 in. wide. The air temperatures most suitable for drying linseed to a moisture content of 7% were 150° and 175°F. for seed with moisture contents of 9 to 11% and 15 to 18%, respectively, with an air velocity through the seed of 75 to 85 ft. per min. [duration not stated]. The germination and chemical composition of linseed dried at 175°F. were not impaired. Trials were carried out with the bulk storage of linseed in metal and wooden bins and in sacks for four months. Results indicated that linseed with a moisture content of 8%, or above, developed high temperatures during storage. For seed containing 6 to 7% moisture, the type of storage used was an important factor. Temperatures in linseed with this moisture content were much higher in the metal than the wooden bins and the sacks. Linseed temperatures were consistently higher in the metal bin with the smallest diameter (9 ft. 10 in. diameter and 10 ft. high) than in the bins of larger diameters. Linseed with moisture contents ranging from 7 to 9% were stored in well-ventilated sacks with no reduction in seed germination. The trial results demonstrated the need for aerating seed stored in metal bins. Prolonged storage temperatures of more than 86°F. resulted in a reduction in seed germination. —P.J.B.

SAFFLOWER

531 SELLSCHOP, J. **The production of safflower seed.** *Fmg S. Afr.* 1951, **26**, 253-6, bibl. 8.

This article, intended as a guide to prospective safflower (*Carthamus tinctorius*) seed growers, describes the plant, its climatic and soil requirements, seed treatment before sowing, sowing depth, methods of sowing and cultivation, harvesting and the industrial uses of safflower oil.—K.L.

SUNFLOWER

532 BANDEIRA, A. T. El girasol. [**The sun flower.**] *Bol. Inst. Nac. Col.* 1951, **2**, No. 20, 4-5.

Advice is given for the cultivation of sunflower in Uruguay. Sunflower should be sown between early September and the end of December (the earlier sowings giving higher yields), at a rate of 6-7 kg. per ha. with 80 cm. between rows. The crop should be thinned to a spacing of 35-40 cm. between plants. Harvesting should begin when the flowers droop and the lower part of the capitulum becomes tobacco-coloured.—N.G.S.

533 ALGERIA, Gouvernement Général, Inspection Générale et Direction de l'Agriculture. Bull. No. 168. Conseils pratiques sur la culture du tournesol en Algérie. [**Practical advice in growing sunflower (*Helianthus annuus*) in Algeria.**] By *P. Laumont.* [n.d.], pp. 2.

534 AGRICULTURAL GAZETTE OF NEW SOUTH WALES. **Production of sunflower seed—high yields possible.** *Agric. Gaz. N.S.W.* 1951, **62**, 350.

The article gives an account of trials carried out at Yanco Experiment Farm, N.S.W., with the sunflower varieties, Sunrise, and Advance Hybrid grown from first and second generation seed. Both types of Advance Hybrid yielded better and were more vigorous than Sunrise.—K.L.

535 POLJAKOVA, Z. P. [**Disinfection of seed of sunflower (*Helianthus annuus*) by means of hot water.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 10, 74-5.

In Western Siberia, and particularly in Omsk Province, sunflower is severely attacked by *Sclerotinia libertiana*. In experiments conducted in 1948 the percentage germination of infected seeds on the 5th day following different methods of disinfection was as follows: disinfection by steeping for 10 min. in water at 60°C., 88-92; wet disinfection with formalin 1 : 300 and 1 : 100 for 15 minutes, 39.5 and 38.0 respectively; wet disinfection with Granozan 0.25% for 40 min., 25.7. The germination of the control, dry seeds, was 22%.—R.P.J.

536 TARANČUK, M. L. [**The effect on the quality and yield of sunflower seed of the nutritional conditions under which it is produced.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 6, 50-1. [Voronež Agric. Expt Sta. Oil Crops]

An investigation with elite seed of sunflower (*Helianthus annuus*) of the Cernjanka 35 variety is reported. On the NPK manured plot the seed was of better quality and the yield higher than on the control, unmanured plot. The respective seed yields were 21.03 and 19.98 centners (centner = 100 kg.) per ha.—R.P.J.

537 ŠEVČENKO, F. P. and GUSELJNUKOV, A. A. [**Granozan in the control of diseases of sunflower (*Helianthus annuus*).**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 9, 73-4. [Barnaulj State Sel. Sta.]

Disinfection of sunflower seeds with Granozan is effective in controlling *Sclerotinia libertiana* and *Bacterium solanaclarum*, the most serious diseases of the sunflower in Western Siberia. In trials at the Station in 1950, the density of the stand of seedlings grown from infected seeds which had been treated with Granozan was greater than that of the control grown from untreated seed. When healthy seeds which had been treated with Granozan were sown, the seedlings appeared more uniformly and rapidly than when untreated seeds were sown. During the period of full flowering of the variety Skorospelyĭ prjamostojačiĭ, a count on 2 August showed that on plots sown with disinfected seeds 85% of all the plants had already flowered, while on the untreated control plot only 49% had done so.—R.P.J.

538 ČERNOMAZ, P. A. [**The influence of size of seeds and of supplementary artificial pollination on the yield of sunflower (*Helianthus annuus*).**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 12, 72-3.

An experiment was conducted in 1949 in which seed of the Cernjanka 35 variety of sunflower was sieved and divided into 3 fractions according to size: i.e., over 4 mm. (large), from 4 to 3 mm. (medium), and 3 mm. and under (small). The absolute weights of the seeds were: large, 84.8 g.; medium, 62.2 g., and small 41.10 g. The seeds were sown at the rate of 0.3 million per ha. on plots of 425 square metres, in drills 60 cm. apart, for comparison with non-graded seed. Artificial pollination of some of the plants originating from seed of all 3 grades was performed on the 4th day from the beginning of flowering, which lasted from the 3 to 16 July. On some plants pollination was repeated on the 9th day. The seed was harvested on 1 September. Plants from large seeds, without supplementary pollination, gave an increase of 1.5 centners (centner = 100 kg.) per ha. compared with control plants derived from non-graded seed. Plants from medium seeds gave a yield which was not lower than that of plants from the initial, non-graded seed. The sowing of small seed reduced the yield by 3.5 centners per ha. compared with the initial, non-graded seed. The effectiveness of sowing large seed was markedly increased by artificial pollination, while the increase in yield was almost doubled by carrying out artificial pollination twice instead of once.—R.P.J.

RAPE

539 ENGEL, H. Zur Technik des Rapsanbaues in Sachsen-Anhalt. [**The technique of rape cultivation in Anhalt-Saxony.**] *Dtsch. Landw.* 1951, **2**, 354-6. [Halle a.S., Germany]

540 KRISHNAMURTI, T. S. **Rape and mustard.** *Indian Fmg* (N.S.) 1951, **1**, No. 6, 15-16.

Tabulated information is given on 12 varieties of rape and mustard. [No distinction is made as to which varieties are rape and which are mustard.] —N.G.S.

OTHER

541 PARGUEY, G. and THOMAS, M. La culture du colza en Eure-et-Loir. [**The cultivation of colza in Eure-et-Loir.**] *Potasse* 1951, **25**, 127-30, illus.

A brief account is given of colza cultivation, including information on: rotations, preparation of the soil, manuring, sowing, varieties, pests, harvesting, threshing, yields and conservation. The information applies specifically to this Department of France.—D.B.

542 MINKEVIČ, I. A. [**A new oil crop—*Euphorbia lathyris* L.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 9, 40-3. [All-Union Sci. Res. Inst. Oil Crops]

Euphorbia lathyris is an annual which grows wild in both the European and Asiatic regions of the Soviet Union. Seed yields per ha. range from 12 to 14 centners (centner = 100 kg.) and may reach 20.5 centners. Trials from 1948 to 1950 under the conditions prevailing in Krasnodar showed that the best results are obtained by sowing from the end of October to the beginning of November at the rate of 20 kg. of high-quality seed per ha., in drills 60 cm. apart. The oil content of the seeds fluctuates from 48 to 53%. In experiments conducted by the Institute from 1949 to 1951 in Rostov, Voronež and Kunsk provinces, high seed yields were obtained, and the possibility of growing the plant in the more northerly regions of the Union was demonstrated. —R.P.J.

LAND USE, SURVEYS AND MANAGEMENT

543 Fina, A. L. de. Sistema práctico para dividir los paises en distritos agroclimaticos. [**A practical system for dividing countries into agroclimatic districts.**] *Rev. Invest. Agric.* 1950, **4**, 341-55, bibl. 6. [Inst. Suelos y Agrotec., Buenos Aires, Argentina]

An agroclimatic district is defined as one which is of the greatest area in which the climatic conditions are sufficiently uniform to ensure that the same cropping can be practised with similar probabilities of success in all areas within the district, and in which the interior areas do not differ fundamentally in regard to soil and moisture conditions. Climate is defined in terms of the following five values based on records covering at least 15-20 years: 1. the average maximum monthly temperature; 2. the average minimum monthly temperature; 3. the average precipitation of the hottest month of the year; 4. the average precipitation of the coldest month of the year; 5. the average precipitation of the remaining six months expressed as a percentage of the average precipitation for the six months constituted by the hottest and coldest quarters. Tables are set out allotting numbers to the ranges of values obtained for 1-4 above and symbols for 5. A map is given of the Argentinian Mesopotamia classified according to this system. Detailed instructions are given for the preparation of maps from these figures.—N.G.S.

544 Whyte, R. O. **A Mediterranean survey. An example of fodder resources assessment.** *World Crops* 1951, **3**, 425-9, illus.

A popular account is given of the area and its problems. The survey carried out under the auspices of FAO and OEEC in Southern France, Greece, Italy, French North Africa, Portugal and Turkey is described.—N.G.S.

545 Zanini, E. Orizzonti dell'agricoltura siciliana. Boschi e pascoli montani. Coltivazioni erbacee e legnose. [**Sicilian agriculture. Woods and mountain pastures. Herbaceous and ligneous crops.**] *Guida Ires per la Sicilia* 1951, pp. 84.

This review of Sicilian agriculture gives information on the crops grown at present and suggests other crops which could be developed in the island. —E.B.

546 Evenari, M. **Ecological investigations in Palestine—2. On the vegetation of Kurkar hills.** *Bull. Res. Coun. Israel* 1951, **1**, No. 1/2, 48-58, bibl. 15. [Hebrew Univ., Jerusalem]

Israel is the meeting place of 3 phytogeographical regions, namely, the Mediterranean, the Irano-Turanian, and the Saharo-Sindian. The Mediterranean territory of Palestine is composed of a mountainous area and a coastal plain. The Kurkar hills are located on the coastal plain and bear a vegetation quite distinct from that of the surrounding Mediterranean area. This paper is concerned with the following problems: (1) why Saharo-Sindian desert-like and Sudano-Deccanian savannah-like associations occur under typical Mediterranean climatic conditions; and (2) what ecological factors are responsible for the fact that these two different associations grow side by side. From a study of a typical Helianthemetum (Saharo-Sindian community) and an *Eragrostis/Centaurea* association containing Sudano-Deccanian elements (in which study observations were made on the osmotic values of plants, the composition and suction forces of soils), it is concluded that the soils represent a desert in which nutrient elements are lacking, especially nitrogen, and not a desert lacking only moisture. This accounts for the presence of the Saharo-Sindian elements in the Mediterranean territory, and also for the fact that the two associations grow in proximity, but the investigation has not revealed an answer to the question as to why Sudano-Deccanian elements occur in the region.—M.H.

547 Sudan Government. Jonglei Investigation Team. **The Equatorial Nile Project and its effects in the Anglo-Egyptian Sudan.** [n.d.], pp. 13.

The Equatorial Nile Project forms one part of a most comprehensive hydrological plan, put forward by Egypt, for controlling the Nile and, if implemented, will alter radically the existing regime of the White Nile in the Sudan between the Sudan-Uganda frontier and Kosti, approximately 640 miles North. The effects on the inhabitants of the riverain belt along this reach of the Nile will be drastic and the purpose of the Jonglei Investigation Team, set up by the Sudan Government in 1945, is to examine the implications of the project, and, where necessary, to suggest remedies. An account is given of the 5 major control works needed showing how they will affect the present seasonal river levels. As a result of these changes, there will be, in some regions, a total loss of riverain grazing and, in others, a substantial reduction in its area. Unless adequate alternatives can be provided, overstocking, overgrazing of what is left, and a reduction in the cattle population must ensue. Remedial suggestions for offsetting this state of affairs are discussed. They include the possibility of controlling the discharge in the new river system to modify its severe effects, the provision of water points in areas of natural grazing away from the river, the improvement of existing but unexploited pastures by various methods, and the provision of artificially irrigated grazing by water from the river or canal. Although these measures would mainly benefit the cattle-keepers, agriculture could be improved by the introduction of more advanced techniques, drought- or flood-resisting crops, better systems of drainage and rudimentary forms of irrigation. It is probable that a combination of all remedial measures will need to be applied in varying degrees according to the terrain and the peculiarities of the people involved. It will be appreciated, therefore, that to safeguard the vital interests of the inhabitants likely to be affected by the Nile Project will involve a full programme of research.—C.L.S.

548 DUMONT, R. Étude de quelques économies agraires au Sénégal et en Casamance. [**A study of some agricultural economies in Senegal and Casamance.**] *Agron. trop.* 1951, **6**, 229-38.

There is a general misuse of land in these regions, a result of the development of groundnut growing for export. The main remedies suggested are: that cropping should be shifted from higher to lower lands; that crops, such as millet (*Pennisetum*), sorghum, fonio (*Digitaria exilis*) and, especially, forest rice should be replaced as much as possible by swamp rice. With the decrease of the area under dry cereals, it would be possible to prolong the fallow period and to maintain, or increase, the area under groundnuts in Casamance and that under cotton in Chad.—E.B.

549 SOUTH AFRICA Department of Agriculture. Bull. No. 309. **Agro-economic survey of the Union. (IV) Diversified farming areas east of the Drakensberg Range.** 1949, 120. [Received 1950]

The following regions are discussed in detail: 1. The Foothills, 2. Natal Sourveld, 3. Natal Temperate Area, 4. East Griqualand, 5. Unga Plain, 6. The Transkei. Particular reference is made to situation, topography, climate, rainfall, soil, vegetation, farming systems, land utilization, capital investment, crops and stock, the economic factors and social aspects of the areas discussed.—K.L.

550 TAYLOR, J. L. **Saipan, a study in land utilization.** *Econ. Geogr.* 1951, **27**, 340-7, bibl. 8.

Saipan is the second largest of the Mariana Islands. The staple field crops are maize, beans, sweet potatoes, and other roots. The local maize variety is a white, large-grained, semi-dent type.—N.G.S.

551 UNITED STATES Department of Agriculture. Agric. Monograph No. 7. **Exploratory study of the principal soil groups of Alaska.** By *C. E. Kellogg* and *I. J. Nygard*. 1951, pp. 138, bibl. 29.

A broad outline is given of the main soil groups of Alaska, the types of vegetation found on them and brief notes of their agricultural potentialities.—P.J.B.

552 PANFILO RODRIGUEZ and PETERSON, A. W. Capacidad de producción económico-agricola de dos áreas del Canton de Turrialba, Costa Rica. [**The economic-agricultural production capacity of two areas in the Canton of Turrialba, Costa Rica.**] *Turrialba* 1951, **1**, 234-9, bibl. 3, illus., map 1, English summary p. 239. [Inst. Interamer. de Cienc. Agric., Turrialba, Costa Rica]

The theory that, within an agricultural region, differences in the productivity of land are associated with differences in production per person rather than with differences in the area farmed per person, was tested for two neighbouring areas in the Canton of Turrialba and proved correct.—N.G.S.

553 ARGENTINA. Instituto de Suelos y Agrotecnia Yapeyu, Cuna Sanmartiniana, estudiado por los nuevos metodos agroecologicos rapidos argentinos. [**Yapeyu (Argentina), cradle of San Martin, studied by the new rapid Argentinian agro-ecological methods.**] *Rev. Invest. Agric.* 1950, **4**, 417-26.

The district of Yapeyu was studied using the new methods evolved in Argentina, which are briefly described. Further details of these are given in Abs. 543 and *Fld Crop Abstr.* 3 : 1545.—N.G.S.

FARMING SYSTEMS AND PRACTICES

554 MEAD, W. R. **The cold farm in Finland.** *Geogr. Rev.* 1951, **41**, 529-543, illus. [Univ. Coll., London]

Many Finnish refugees from the territory ceded to Russia in 1944 have been resettled on cold farms. Cold farms are defined as those from which the yield at the time of settlement does not exceed 10% of the yield to be expected from all the land on the farm when in full production and on which no accessible buildings exist. The development of a cold farm is a form of pioneer settlement and a broad outline is given of the type of reclamation practised in the parish of Lapinlahti in the north-central lake country. Clearance machinery was provided on a small scale by a state-subsidized pool. The eventual objective of the cold farmers is a balanced husbandry.—N.G.S.

555 DE FELLNER, C. **Collective farming in Yugoslavia.** *World Crops* 1951, **3**, 485-8, illus.

Yugoslavia is potentially rich agriculturally and land reform after the first World War had converted it into a country of smallholdings. Thus it was not receptive to collective farming, which was introduced after the second World War for the practical reason of tapping agricultural manpower as well as for ideological reasons. There are four main types of cooperatives. 1. Fields are rented for up to 30% of the income to the cooperative. One hectare remains under the private management of each farmer. He can keep one cow, one or two pigs, five to ten sheep and poultry. Fodder for these animals is provided by the cooperative. The farmer has to work in the cooperative. 2. All fields are taken over by the cooperative. As indemnity, the farmer receives 6% of the value of his property, a special percentage of the income from his fields and a further sum for his work. 3. All land of the members is taken over by the cooperative. Work and income are divided between members, but the fields still remain individual property. 4. As for 3, but without individual ownership of the fields. All cooperative members of types 2, 3 and 4 retain a small plot for a kitchen garden, some poultry and one or two pigs. The collective farms are operated on the principle that each co-operative should work out its own details, and that there need be no strict uniformity. Labour is divided into 'brigades' of 15-30 members, which are subdivided into smaller groups of 5-7. The book-keeping and accounting methods have proved too intricate and are unsatisfactory. Owing to inadequate supplies of machinery and a series of droughts, collective farming in Yugoslavia has yet to prove successful. —N.G.S.

556 LAUMONT, P. Dry-farming américain ou aridoculture nord-africaine? [**American dry farming or North-African arid cultivation?**] *Bull. Soc. Agric. Algérie* [n.d.], No. 531, pp. 18.

T. D. Campbell, of the USA, has suggested that American dry farming methods should be adopted in North Africa to increase wheat production. The author compares this system with the arid cultivation long practised in North Africa and points out that, although the total annual rainfall of the High Plateaux of North Africa is similar to that of the American Western Great Plains, its seasonal distribution is unfavourable to the new methods proposed. He is of the opinion that it is not advisable to alter the present system of arid cultivation in Algeria.—E.B.

557 LAUMONT, P. Rotations et assolements. [**Crop rotation and field distribution of the courses.**] *Bull. Soc. Agric. Algérie* [n.d.], No. 553, pp. 32, bibl. in text.

After a general introduction on crop rotation, the principal rotations suited to regions of different rainfall in Algeria are given. The rotations now more frequently practised in this country are the 2 years' fallow/wheat and the 3 years' fallow/wheat/barley or oats. Rotations, including an irrigated lucerne ley, generally lasting for 3 years, are recommended.—E.B.

558 ILLINOIS Agricultural Experiment Station. Bull. 539. **Soil building with legumes. Results from Illinois soil experiment fields.** By *H. J. Snider*. 1950, pp. 547-560.

The average organic matter of 6 dark- and 6 light-coloured soils was 38 and 15.6 tons per ac. and average maize grain yields, 48 and 10 bu. per ac., respectively. On the Morrow plots at Urbana, the total organic matter content of the soil under a maize/oats rotation was 36.2 tons per ac., compared to 39.7 tons per ac. where manurial treatment in the rotation included dung, limestone and rock phosphate. Under a maize/oats/red clover rotation, the soil organic matter content was 38.4 tons per ac., compared with 47.8 tons per ac., where the rotation included manure, limestone and rock phosphate. Under the maize/oats rotation where manurial treatment was included, the maize yield in 1943 was 83 bu. per ac., compared to 101 bu. per ac. for the rotation including clover and manurial treatment; oat yields were 54 and 72 bu. per ac., respectively. The protein content of the grain for the rotation that included the clover was considerably higher than that where the rotation did not include clover. In trials at Joliet, a mixture of alfalfa and red clover was superior to soyabeans in improving the yield and protein content of maize grain. The seed and top + root dry-matter yields of soyabeans for a 24.4 bu. per ac. crop were 1460 and 3740 lb. per ac., while the yield of N was 94 and 48 lb. per ac., respectively. Thus the residues of the tops and roots of soyabeans when returned to the soil are not sufficient to compensate for the N removed in the seed.—P.J.B.

559 SOUTH DAKOTA Agricultural Experiment Station. Circ. 83. **Irrigated crop rotations on the clay soils of western South Dakota.** By *H. E. Weakly* and *L. B. Nelson*. 1950, pp. 23.

Experiments carried out over the last 38 years have shown that on irrigated clay soils yields are only maintained at a satisfactory level by a combination of a good alfalfa or sweet clover rotation with an adequate supply of farm-yard manure and phosphate fertilizer. Three-year rotations without alfalfa will not maintain soil fertility, even with farm-yard manure. Barley, oats and sugar-beet are the commonest crops grown. Nitrogenous fertilizers are not required. Since irrigation water enters thin clay soils mainly through cracks, small heads of water are required. Water should be left on the land only long enough for complete coverage.—C.W.S.H.

560 GARTON, J. E. **A graphic method of finding the depth of irrigation water applied.** *Agric. Engng, St. Joseph, Mich.* 1951, **32**, 376. [Oklahoma Agric. Expt Sta., Stillwater]

Details are given of a simple nomograph for the computation of the depth of water applied during irrigation. The nomograph can be very simply adapted to plot work.—P.J.B.

561 KAUSHIK, R. D. **Mixed cropping in the Delhi State [India].** *Allahabad Fmr* 1951, **25**, 142-9.

Mixed cropping is divided into 3 classes:—crop mixtures, where the seed is thoroughly mixed before sowing; companion crops, where two crops are sown in alternate rows; guard crops, where a crop is sown around a major crop as a protective measure. The advantages of mixed cropping are enumerated and the 14 most important mixtures cultivated in Delhi State are listed.—N.G.S.

562 REVISTA DE LA BOLSA DE CEREALES. Epoca de siembra y cosecha de los productos agricolas en el pais. [**Time of sowing and harvesting of agricultural crops in Argentina.**] *Rev. Bolsa Cer.* Num. estadistico, 1951, 169.

The sowing and harvesting seasons are tabulated for some 50 crops in Argentina.—N.G.S.

SOIL AND WATER CONSERVATION

563 PREGO, A. J. Conservación del suelo. [**Soil conservation.**] *Idia* 1951, **4**, No. 42-3, 7-13, bibl. 7, illus., map 1.

The problems of soil conservation are discussed with particular reference to Argentina. The water-erosion and wind-erosion areas of Argentina, as determined by a preliminary survey, are mapped.—N.G.S.

564 UNITED STATES Department of Agriculture. Circ. No. 871. **Depletion of High Plains wheatlands.** By *H. H. Finnell.* 1951, pp. 18. [Soil Conserv. Serv., Goodwell, Okla.]

An account is given of the factors affecting wheat yields in the High Plains in parts of Colorado, Kansas, New Mexico, Oklahoma and Texas. The factors studied were: duration of cultivation, erosion, weed growth, soil-moisture penetration, effective rainfall, soil texture and sowing dates. Weed growth and sowing dates were, apart from erosion, of greatest importance since they were under the control of the cultivator. 1-10 Sept. was shown to be the optimum period for sowing. Soil lost by wind erosion, which in the area as a whole is more important than water erosion, consists largely of organic materials. Losses due to erosion in the higher-yielding fallowed wheatlands appear greater than in continuously planted wheatlands, but this greater effect is really due to the yield ceiling imposed by erosion. Depletion of the land is also caused by removal of nutrients, but depletion through erosion is much more rapid in the first few years. Depletion has been greater than yield figures suggest, for while productivity has fallen by 22%, improved varieties are capable of producing 21% more than old ones. Slopes greater than 2% should be contour-farmed against water erosion. Wind erosion and loss of nutrients will need to be tackled by developing rotations with soil-building crops, and by perfecting the technique of applying fertilizers.—C.W.S.H.

565 SOUTH WEST AFRICA Commission of Enquiry. **Conclusions and recommendations on soil and water conservation.** *Rep. Long Term Agric. Policy Comm.* [n.d.], 65-71, illus.

It is concluded that the social and economic structure of S.W. Africa, where natural conditions at best are marginal, is dependent mainly on the stability of pastoral farming. In the last 30 years the soil has become more arid, the vegetation more xerophytic and loss from wind- and water-erosion more extensive, while land settlement is approaching saturation point and the limit of the stock-carrying capacity of the area under occupation has been reached. Overstocking, wrong grazing management and overcutting and burning of veld are responsible for the deterioration of the vegetation. The perennial rivers on the boundaries of the Territory cannot be harnessed to affect the problem of water conservation and so the country is dependent on sub-surface sources of water in sand-filled rivers, subterranean supplies and open storage. Since soil- and water-conservation are fundamental to the welfare of the area, it is recommended that these should be ensured by the prevention of soil erosion, the reclamation of eroded areas, the prevention of overstocking, the destocking of marginal semi-desert areas and the protection of the natural vegetation. To this end it is recommended that the technical agricultural and geological survey services be augmented, that greater assistance be given for dam construction and for fencing material, that the State undertake storage reservoir construction and that legislation be enacted without delay to implement these findings. In addition, it is recommended that demonstrations of improved methods of farming, with conservation of the natural resources as the key-note, be undertaken on Government and private farms.—C.L.S. From *Herb. Abstr.*

566 CORNELL UNIVERSITY Agricultural Experiment Station. Ext. Bull. 800. **Contour strip-cropping.** By *H. M. Wilson* and *H. A. Kerr.* 1950, pp. 15.

A practical outline is given of the technique of contour strip-cropping.—P.J.B.

567 CORNELL UNIVERSITY Agricultural Experiment Station. Ext. Bull. 808. **Diversion terraces.** By *H. M. Wilson* and *H. A. Kerr.* 1950, pp. 16.

A practical outline is given of the planning and construction of diversion terraces for soil conservation.—P.J.B.

568 RAYCHAUDHURI, S. P. **Reclamation of waste lands and land gone out of cultivation.** *Indian Fmg* 1950, **11**, 390-5. [Indian Agric. Res. Inst., New Delhi]

India contains some 87 million acres potentially suitable for cultivation. Ten million acres will have to be reclaimed if the target of the Foodgrains Policy Committee is to be achieved. A detailed survey of the waste lands is required. Projects for reclaiming weed-infested, saline and alkaline lands are briefly reviewed.—N.G.S.

569 IVES, N. C. **Soil and water run-off in a tropical region.** *Turrialba* 1951, **1**, 240-4, bibl., 5, illus. Spanish summary p. 240. [Inst. Interamer de Cienc. Agric., Turrialba, Costa Rica]

WEEDS AND WEED CONTROL

570 SCIENCE AND CULTURE. **The menace of weeds.** *Indian Fmg* 1950, **11**, 422-32, bibl. 39.

This is a review article, with particular reference to India.—N.G.S.

571 SISSINGH, G. Onkruid-associaties in Nederland. [**Weed associations in the Netherlands.**] *Versl. Landbouwk. Onderz.* 1950, **15**, No. 56, pp. 224, bibl. 253, illus., French summary pp. 192-206. [State For. Serv., Gorssel, Netherlands]

This work is published also as *Comm. S.I.G.M.A.* [Internat. Sta. Medit. Alpine Geobotany] No. 106, Montpellier. Surveys have been in progress since 1939 and the study covers the whole of the Netherlands, although more attention has been paid to the east than to the west. The weed associations of the Netherlands belong to the sociological Class of the Rudereto-Secalinetea according to Braun-Blanquet, and this ecologist's classification system is followed throughout the work with the author's own modifications. Of this Class, four Orders cover the country's weed associations (approximately 40), and these are described and discussed in considerable detail in four chapters. Some general characters of the majority of the associations are their pioneer nature; the termination each year of their life cycle, either by natural conditions such as flood, storms, desiccation, etc., or by cultural activities; their nitrophilous character; their long growing season, the mean number of days ranging from 347 to 355; the relatively large proportion of annuals and of adventive plants. Thirty-five floristic lists are appended in a separate folder.—G.M.R.

572 CHEVALIER, A. Mauvaises herbes envahissantes, fléaux redoutables pour l'agriculture en Afrique tropicale. [**Invading weeds, formidable scourges of agriculture in tropical Africa.**] *Rev. Bot. appl.* 1951, **31**, 390-9, bibl. in text.

The most noxious weeds, which are an increasingly serious problem in the grasslands and crops of west and central Africa, are reviewed on the basis of literature on the subject and of information collected by the author in those regions. The principal weed species are: *Imperata cylindrica, Cyperus rotundus, Acanthospermum hispidum* and *Lantana camara.* The practice of burning the savannah favours the development of various noxious species, among which are *Andropogon* and *Hyparrhenia* spp.—E.B.

573 GUILLAUMIN, A. Les plantes nuisibles de Nouvelle-Calédonie. [**The noxious plants of New Caledonia.**] *Rev. Bot. appl.* 1951, **31**, 427-30.

A review is given of the principal noxious species of New Caledonia, most of which were introduced from other countries. Among the weeds of crops are: *Cyperus rotundus, Indigofera suffruticosa, Mimosa pudica, Cenchrus calyculatus, Cynodon dactylon.*—E.B.

574 MARTINEZ CROVETTO, R. Las malezas de los montes frutales en el Nordeste de Entre Rios. [**The weeds of the hill orchards in the Northwest of Entre Rios (Argentina).**] *Rev. Invest. Agric.* 1950, **4**, 357-401, bibl. 8, illus.

Descriptions are given of 77 weeds occurring in the hill orchards, 17 of these weeds being illustrated by plates.—N.G.S.

575 TIMMONS, F. L. and BRUNS, V. F. **Frequency and depth of shoot-cutting in eradication of certain creeping perennial weeds.** *Agron. J.* 1951, **43**, 371-4, bibl. 15. [Fort Hays Branch Agric. Expt Sta., Kansas]

The weeds studied were: field bindweed (*Convolvulus arvensis*), white top (*Lepidium draba*), Russian knapweed (*Centaurea repens*), dogbane (*Apocynum cannabinum*), Johnson grass (*Sorghum halepense*) and climbing milkweed (*Ampelamus albidus*, also known as *Gonolobus laevis*). Except for the Johnson grass, all the weeds grew on rather heavy silt to silty-clay loam. The Johnson grass was grown on bottom-land sandy loam. Hoeing field bindweed to a depth of 1 in. every 7 days required 42 operations to obtain eradication in 2 seasons, while hoeing every 14 days required half that number of operations to secure eradication. Extending the intervals between hoeings to 18, or 21 days, did not result in eradication in 2 years. Cultivation with either 16 in., or 30 in. duckfoot sweeps set at a depth of 3 to 4 in. resulted in eradication in 2 years with 17 operations, with intervals of 21 days between treatments. Hoeing to a depth of 1 in. eradicated Russian knapweed in 2 years, as did duckfoot cultivation at 2 and 3 week intervals. Hoary cress was eradicated in 2 years or less, by an average of 21, 16 and 14 hoeings at intervals of 2, 3 and 4 weeks, respectively. In one trial with dogbane, hoeing at 2- and 4-week intervals secured eradication in 3 years, with a total of 31 and 17 operations, respectively, as did duckfoot cultivation at 3- and 4-week intervals during the same period of time. Johnson grass was eradicated by duckfoot cultivation at intervals of 2, 3, or 4 weeks within one growing season. Climbing milkweed was not eradicated by duckfoot cultivation at 2-, 3-, or 4-week intervals in 2 years, though stands were reduced. Bindweed appeared to develop regrowth rapidly, necessitating more frequent cultivation of this species than the others to secure eradication. There were no practical advantages in cultivating below a depth of 4 to 5 in. in any case.—P.J.B.

576 ENGLAND and WALES, Ministry of Agriculture and Fisheries. Adv. Leafl. 89. **Couch or twitch.** 1951, pp. 4.

The three species described in this leaflet are: *Agropyron repens*, *Agrostis tenuis* and *Arrhenatherum elatius*. Control measures include: destroying the rhizomes and underground vegetative parts by full or bastard fallowing; stubble cleaning; ploughing, where possible, to a depth of 15 to 18 in.; hand digging of couch on the borders of the field; the application of 2-3 cwt. per acre of sodium chlorate.—K.L.

577 ENGLAND and WALES, Ministry of Agriculture and Fisheries. Adv. Leafl. 371. **The control of hoary pepperwort.** 1951, pp. 5.

The eradication of *Cardaria* [*Lepidium*] *draba* is difficult because of the plant's adaptability to a wide range of soil and climatic conditions. Because the weed's extensive root system penetrates deeply in the soil, the best cultural means of control is by ploughing to a depth of 15 in., and then fallowing the land. Where heavy infestations occur in cereal crops, eradication can be obtained (a) by the application of the herbicide sprays MCPA or sodium salt of DCPA at 2 lb. active ingredient per acre, or (b) dusts at the rate of 4 lb. per acre. MCPA should be applied when the hoary pepperwort flower buds are appearing and DCPA when the flower buds are open. These control measures should be adopted on at least two consecutive cereal crops.—K.L.

578 PADWICK, G. W. ***Imperata* grass.** *World Crops* 1951, **3**, 396, illus.

The value of Kudzu (*Pueraria* spp.) in suppressing *Imperata* grass in Zanzibar is clearly illustrated in four photographs. [See also *Herb. Abstr.* 21: 864]—N.G.S.

579 DELLE COSTE, A. C. Cardos y quinoas, su control con matayuyos. [**Thistles and quinoas (in Argentina), their control by herbicides.**] *La Chacra* 1951, **21**, No. 252, 68, illus.

Quinoas (*Chenopodium* spp.) can be controlled in *Phalaris canariensis*, wheat, maize, oats, barley and rye by 100-250 g. 2,4-D ester per ha., 300-750 g. 2,4-D ammonium salt per ha., or 700-1000 g. MCPA sodium salt per ha. In flax, the sodium salt of MCPA should be used at a rate of 550-780 g. per ha. Thistles are more resistant to herbicides; *Silybum marianum*, *Carduus acanthoides*, *Carduus tenuiflorus*, *Cirsium lanceolatum*, *Cirsium vulgare*, *Carduus nutans*, *Carthamus lanatus*, *Salsola kali* and *Centaurea melitensis* are the more sensitive thistles, and can be controlled by 600-1000g. 2,4-D sodium salt per ha. The more resistant thistles, such as *Cynara cardunculus*, *Centaurea calcitrapa* and *Centaurea solstitiales* require heavier rates of application, preferably of 2,4-D esters.—N.G.S.

580 BORDELEAU, R. and COITEUX, F. Résultats d'expériences sur l'enraiement des mauvaises herbes dans les cultures de betteraves sucrières. [**Results of trials on weed control in sugar-beet crops.**] *Rev. d'Oka* 1951, **25**, 27-31.

Weeds create a serious problem in sugar-beet crops in Quebec. The Sta. exp. féd. de l'Assomption began in 1949 a series of trials on weed control in sugar-beet crops on land previously under pasture. These trials are proceeding. The products tested in 1949 were: cyanamide, Shell oil No. 3 and common salt. 2,4-D preparations, which are known to damage sugar-beet, were not included in the 1949 trials. Cyanamide and common salt failed completely. Treatment with Shell oil No. 3, applied 4 days after sowing at the rate of 40 gal. per acre, gave good results, all weeds being destroyed, with the exception of *Agropyron repens*. In 1950, various herbicides were tested before and after the emergence of beet seedlings. Of the preparations applied before emergence, sodium pentachlorophenate gave the best results, but it cannot yet be recommended. In the post-emergence trials, the preparations were applied when the beet plants were at the thinning stage. Of the preparations tested, pentachlorophenol showed some promise. In these trials a method was studied employing metal strips to cover the rows of beet while spraying the herbicide, but despite this protection 2,4-D amine still affected the sugar-beet plants which became deformed. Trials will continue with pentachlorophenol and with other preparations.—E.B.

581 Panella, A. and Bavicchi, F. Gli erbicidi selettivi nella lotta contro le erbe infeste del frumento e del granturco. [**The control of weeds of wheat and maize with selective herbicides.**] *Ann. Tec. agr.* 1950, **16**, 90-109, bibl. 9, illus. [Inst. Agron., Perugia Univ., Italy]

The effect of various herbicides on the principal weed species of the region is described. The following treatments were compared in wheat crops: (a) control, untreated and unweeded; (b) hand weeding; (c) Fernoxone 1% sol., 1000 l./ha.; (d) Agroxone 1% sol., 1000 l./ha.; (e) Agroxone C powder, 250 kg./ha.; (f) Weedone 1% sol., 1000 l./ha.; (g) pure 2,4-D 0.2% sol., 1000 l./ha. The weeds of the wheat plots were counted on the day when treated and one month afterwards. In trials with maize intercropped with kidney bean, Agroxone C was mixed with the soil at the rate of 150 kg./ha. before sowing the crop. The general main conclusions were as follows: (a) the susceptibility of the weeds to the herbicides varied according to the botanical family and the stage of development, the Leguminosae in the first stages of development being very susceptible, the mature Compositae less susceptible, and the Gramineae very resistant; (b) of the selective herbicides tested, pure 2,4-D proved the most effective, followed by Agroxone, Weedone, 2,4-D in bentonite jelly (a preparation not yet available to the trade) and Agroxone C; (c) in the trials on wheat, the selective herbicides destroyed about 60 to 70% of the weeds but proved less effective than hand weeding; they did not affect the yield or the quality of wheat, but Fernoxone and pure 2,4-D caused a certain amount of lodging in wheat; (d) in the trials with maize intercropped with kidney bean, Agroxone C was effective against weeds, but harmed the kidney bean plants; it also caused a certain delay in maize development, which, however, had no effect on yield.—E.B.

582 Garese, P. Herbicidas selectivos. [**Selective herbicides.**] *Idia* 1951, **4**, No. 42-3, 14-21, bibl. 10, illus. [Inst. Bot., Minist. Agric. Ganad., Argentina]

The problems and uses of selective herbicides are reviewed. Four types of selectivity are considered: selectivity based upon the minimum humidity of the crop and limited absorption of the toxic substance; selectivity based on the resistance of carrots and other Umbelliferae to certain petroleum products; selectivity based upon differential plasmolysis when the crop is sprayed with salt solutions; selectivity based upon the physiological resistance of many graminaceous species and certain other crops to growth-regulating herbicides, such as 2,4-D.—N.G.S.

583 Barnsley, G. E. **Oil fractions as selective and total weedkillers.** *World Crops* 1951, **3**, 399-401, bibl. 4, illus. [Shell Expt Sta.]

The value of an oil as a herbicide depends upon its power of penetration into the plant and upon its inherent toxicity. Penetration depends upon the morphology of the plant and the physical properties of the oil used. The main morphological factors governing oil penetration are the size and number of the stomata, while the amount of penetration into the stomata depends upon light intensity and atmospheric humidity. Leaf thickness also affects penetration, and thinner leaves are thought to admit more oil It has been observed that deeply divided and spiny leaves are more resistant to light oil fractions, and that oil resistant weeds are often also frost resistant. Volatility determines the length of time an oil is in contact with the plant; with too low a volatility the oil will persist too long, and may damage the crop. The viscosity of an oil is correlated with toxicity to insect eggs as well as to herbicidal effects. Optimum viscosity varies with plant and climate. The phytotoxic efficiency of oils increases with increasing aromatic content and boiling point, but is limited by viscosity. Selectivity is reduced by increasing the aromatic content and boiling point. The optimum time for spraying carrots was found to be the cotyledon stage. The best kill of weeds is obtained on warm sunny days and it is important that selective oil fractions should not be sprayed when there is a danger of frost, since crops are more susceptible when temperatures approach freezing point. Rates of 60-80 gal./acre proved most satisfactory, with a minimum rate of 40 gal./acre. Lower rates may be practicable when crop rows only are sprayed. The optimum pressure for spraying lay between 50-75 lb./sq. in. One application of a white spirit fraction [not specified] gave better control than two applications three days apart of the same total quantity, i.e. 40, 60 or 80 gal./acre.—N.G.S.

CROP BOTANY

584 LITTLE, E. L., Jr. **Citation of scientific names of plants.** *Phytologia* 1951, **3**, 401-5, bibl. 10. [For. Serv., US Dept Agric., Washington 25, D.C.]

Suggestions are made for greater uniformity and clarity.—D.B.

585 MURLEY, Margaret R. **Seeds of the Cruciferae of Northeastern North America.** *Amer. Midl. Nat.* 1951, **46**, 1-81, bibl. 101, illus. [Northwestern Univ., Evanston, Illinois]

This botanical work is concerned with the seed morphology and the systematics of 118 species of Cruciferae. The geographical distribution is given for each species, some of which occur in grain crops.—E.B.

586 SNELL, K. Botanische Sortenkunde. [**Botanical information on varieties.**] *Biol. Zentralanst. Land-und Forstw. Berlin-Dahlem* Festshrift 1949, 48-59, bibl. 19.

The paper is a literature review of the systematic botany of varieties of those agricultural crops in which the Biologische Reichsanstalt has been concerned. These crops include potato, turnip, swede and mangold, wheat and oats, field beans, peas and lupin.—D.B.

587 LIVENS, J. Exigences édaphiques des principales cultures tropicales. [**Edaphic requirements of the principal tropical crops.**] *Bull. agric. Congo belge* 1951, **42**, 295-308, bibl. in text.

The requirements of water and nutritive elements are given for cereals, oil crops, tuber crops, legumes, jute and cotton.—E.B.

588 HENKEL, P. A. [**Resistance of plants to drought and ways of increasing drought-resistance.**] [Russian] *Trudy Timirjazev Inst. Fiziol. Rast.* 1946, **5**, 1-238, bibl. of 14 pages. [Received 1951]

The subject is discussed in 5 chapters and includes the following aspects: the effect of atmospheric and soil dryness on mesophytes, the water regime of some xerophytes, the water regime in some halophytes as a factor of their distribution, and pre-sowing adaptation of plants to drought. The subject of this last division is discussed in 7 parts in which consideration is given to the effect of pre-sowing treatment (light and nutrient regimes) on the physiological characteristics of the plants, with special reference to their drought- and frost-resistance. There is also information on, (a) the effect of pre-sowing treatment on drought resistance and yields of grain crops; (b) developmental stage in relation to increased drought resistance, and (c) the application of the method of increasing drought-resistance by pre-sowing treatment (of barley, peas, sugar-beet, and millet) under field conditions.—M.H.

589 RAU, M. Anantaswamy. **The mechanism of nutrition in the developing seed of *Vigna catjang* Endl.** *New Phytol.* 1951, **50**, 121-3. [Bot. Dept, Univ. Mysore]

A study on the histology of the ovule.—M.H.

590 WHATLEY, F. R. and others. **Distribution of micronutrient metals in leaves and chloroplast fragments.** *Plant Physiol.* 1951, **26**, 414-18, bibl. 19. [Univ. Calif., Berkeley]

The iron, copper, manganese, zinc, molybdenum, and chlorophyll content of leaves and isolated chloroplast fragments of sugar-beets was determined. Of the five metal micronutrients, iron and copper were found to be concentrated in the chloroplasts.—Authors' summary.

591 ŠKOLJNIK, M. J. A. and CTEKLOVA, M. M. [**The physiological role of boron in plants.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **77**, 137-40, bibl. 15.

Results of experiments with flax (*Linum usitatissimum*) are reported. The fact that, in the absence of boron, the introduction of hydrogen peroxide into the nutrient mixture makes it possible to obtain healthy plants and a root system almost as vigorous as with boron, is taken to indicate that the most important part of the physiological role of boron is its capacity to improve the oxygen supply of plants, primarily to their root systems.—R.P.J.

592 PANTANELLI, E. Il ferro nella pianta e in agricoltura. [**Iron in the plant and in agriculture.**] *Ann. Fac. Agr. Univ. Bari* 1950, **7**, 25-28, bibl. in text. [Ist. Agron. Univ. Bari]

The studies by foreign and Italian authors in this field up to 1949 are reviewed and an account is given of personal observations and trials carried out in the biological or agricultural sphere. The subject headings are: iron in the plant; iron in the soil; iron absorption by the plant; action of iron in plant life; form and dose of iron applications. It is pointed out that iron influences crops favourably in several ways, i.e. in nutrition, as a stimulant on yield; in correcting alkaline or salty soils; for treating plant chlorosis when this disease is caused by iron deficiency; as an anticryptogamic.—E.B.

593 WARINGTON, Katherine. **Some interrelationships between manganese, molybdenum and vanadium in the nutrition of soybean, flax and oats.** *Ann. appl. Biol.* 1951, **38**, 624-41, bibl. 28, fig. 10. [Rothamsted Expt Sta., Harpenden, Herts.]

Soyabean and flax were grown in nutrient solutions containing high and low levels of molybdenum and vanadium, in combination with toxic (10 to 25 ppm) and non-toxic (1 ppm) manganese. Molybdenum (at 20 ppm and to a less extent 10 ppm) intensified the chlorosis induced by manganese excess, though these concentrations were harmless in the presence of 1 ppm Mn. Vanadium (≡ 1.0, 5 and 10 ppm Mo) counteracted some of the symptoms of manganese toxicity, but the two higher rates were harmful to growth, irrespective of the manganese supply. Toxic concentrations of vanadium at first deepened the green colour of the shoot, though apical iron-deficiency chlorosis was generally induced later. Low molybdenum (0.1 ppm) or equivalent vanadium had no influence on growth or iron nutrition at either level of manganese. Visual differences were corroborated by changes in the nitrogen, phosphorus and iron contents of the plants. There was no evidence of replaceability of molybdenum by vanadium. Oats were grown in nutrient solutions containing various combinations of manganese (nil to 400 ppm) and molybdenum (nil to 20 ppm). The appearance of manganese-deficiency symptoms was not affected by the quantity of molybdenum provided, and the manganese and molybdenum contents of the leaves were mutually independent of the quantity of each element supplied.—From author's summary.

594 BERTRAND, G. and BERTRAND, D. Le rubidium dans les graines. [**Rubidium in seeds.**] *C. R. Acad. Agric. Fr.* 1951, **37**, 358-60, bibl. 4.

Seed of 46 species representing several kinds of crops have been analysed for their rubidium content. The results, expressed as mg. rubidium per kg. dry matter, are tabulated. The seeds of all the plants examined contained rubidium. The amount varied between 0.6 in seed of rye and 45.7 in seed of coffee (Brazilian). The proportion of rubidium in the seed was about half that found in the aerial portion of the plant taken as a whole. When the results of analysis were grouped according to plant families, the average amount of rubidium per species was: [in mg. per kg. dry matter] Cruciferae 11.6, Leguminosae 10.5, Gramineae 3.6, and other families 11.0.—D.B.

595 TOMBESI, L. Variazioni diurne del contenuto in acido ascorbico e glutatione ridotto e dell'attività ossidasica e catalasica sui tessuti fogliari. [**Variations during day time in the ascorbic acid and reduced glutathione content and in the oxidase and catalase activity in leaf tissues.**] *Ann. Sper. agr.* 1951, **5**, 1021-40, bibl. 8, illus., English summary pp. 1039-40. [Sta. chim.-agr. sper., Roma]

Although no definite results were obtained from this investigation carried out on *Arachis hypogaea*, some preliminary conclusions were reached showing that: (a) data of oxidase and catalase activity are of limited value unless the hour of their determination is specified; (b) with some exceptions, the reduced glutathione decreases and the reduced ascorbic acid increases during the vegetative cycle; (c) the activity of the enzymes is greatly reduced in yellowed tissues at the end of the vegetative cycle, particularly in the afternoon.—E.B.

596 BUCHNER, A. Die Wirkung der Chlorionen auf den Kohlenhydratstoffwechsel in Abhängigkeit von der Kaliversorgung der Pflanze. [**The effect of chlorine ions on carbohydrate metabolism in relation to the potassium nutrition of the plant.**] *Z. Pfl-Ernähr. Düng.* 1951, **54**, 28-36, bibl. 9. [Tech. Hochsch. München, Weihenstephan]

Normal potassium nutrition promotes synthetic reactions. Chlorine nutrition promotes hydrolytic reactions (e.g. starch to sugars and sucrose to glucose). In contrast to the effects of normal potassium nutrition, a deficiency of potassium, relative to chlorine, accelerates the hydrolytic reactions. Chlorine nutrition which results in an unfavourable K : Cl ratio (<1) can produce potassium deficiency symptoms, even in the presence of a high potassium content. This phenomenon was demonstrated in beans.—D.B. From *Herb. Abstr.*

597 LONA, F. Il significato dei glucidi e del fattore antiflorigeno nel meccanismo di fioritura delle piante erbacee ed in particolare delle brevidiurne. [**The significance of carbohydrates and the anti-flowering factor in the mechanism of flowering of herbaceous plants, particularly short-day**

plants.] *Rendiconti Ist. Lombardo Sci- Lett.* 1950, **83**, pp. 22, bibl. 40, English summary p. 20.

The experiments described were carried out with *Chenopodium amaranticolor* and *Perilla ocymoides*, both short-day plants. [See also *Fld Crop Abstr.* 2 : 674, 679 and 680]—E.B.

598 VOSKPESENSKAJA, N. P. [**Concerning the re-establishment of nitrates in leaves under different conditions of illumination.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **79**, 165-8, bibl. 11. [Inst. Plant Physiol. Timirjazev Akad. Sci., USSR]

Leaves of sunflower (*Helianthus annuus*) and maize (*Zea mays*) were used in the experiment. Investigations on the re-establishment of nitrates in the leaves showed that a necessary condition for this process is the presence of light and CO_2. Without CO_2 re-establishment did not take place, which indicates the close connexion in the leaf of this process with photosynthesis. The spectral composition of the light had no significant effect on re-establishment of nitrates, while a change in the intensity of illumination had a marked effect on this process.—R.P.J.

599 BOND, G. **The fixation of nitrogen associated with the root nodules of *Myrica gale* L., with special reference to its pH relation and ecological significance.** *Ann. Bot., Lond.* 1951, **15**, 447-59, bibl. 15. [Bot. Dept, Univ. Glasgow]

The physiological significance of the nodules regularly present on the roots of *Myrica* spp. had received little attention until Bond (*Herb. Abstr.* 19 : 874) presented preliminary evidence that nitrogen fixation is associated with the nodules of *M. gale*. In the present paper more extensive data in support of this are presented and the ecological importance of the fixation is considered. In addition, observations on the pH relation of the development of the nodules and of the fixation process in water culture are reported. From consideration of the typical habitat of *M. gale*, it appears that the endophyte and the nodules are much more tolerant of acid conditions than in the legume. Experimental observations have illustrated the full extent of this difference in pH relation which may be of interest in giving greater understanding of the distribution of *M. gale* in the field. Quantitative data regarding non-leguminous symbiotic fixation of nitrogen are in general scanty, and there has been little progress beyond the mere establishment of the fixation.—From author's introduction.

600 PALAMARČUK, A. S. [**Standardization of inflorescences.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 7, 73-6.

According to data reported by Kozlovskii (*Selek. Semenovod.* 1949, No. 10) the removal of weak shoots from seed-producing plants of fodder-beet increased the 1000-seed weight by 7.8 g. compared with plants not so treated. In experiments in the Botanical Garden of the Ural State University in 1950, following standardization of the inflorescences of 3 varieties of wheat (Diamond, Lutescens 956 and Moskovka), one variety of oats (Golden Rain) and 3 varieties of barley (Viner, Nudum and Primus 11) the absolute weight of the grain was in many cases more than 3 times greater than that of the grain of the untreated control plants. Standardization consisted in the removal of the upper spikelets of ear in wheat and barley and of the lower spikelets in oats.—R.P.J.

601 ORDINA, N. A. [**Concerning the characteristics of profuse growth of the primary meristem in young internodes of wheat.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **79**, No. 3, 521-4. [Cent. Bot. Gdn, Akad. Sci., SSSR]

Large portions of the cell walls may experience profuse growth. This growth occurs only if the walls of the adjoining cells are transposed, sliding one alongside the other. Investigations conducted with young plants of Lutescens 062 wheat at the beginning of the booting stage indicated that sliding growth is natural, not only to individual cells but also to the whole cell complex, and that such growth may take place not only during differentiation of the cells, but also during division of the primary meristem.—R.P.J.

602 WHATLEY, F. R. **Coenzymes in plants.** *New Phytol.* 1951, **50**, 244-57, bibl. 21.

The object of this work was to investigate the distribution of coenzyme I, coenzyme II, and flavine adenine dinucleotide in plant organs. *Avena sativa* and *Phaseolus multiflorus* comprised part of the material studied : in these the coenzymes are shown to be widely distributed.—M.H.

603 JONES, M. W. and others. **The bioelectric potential of seeds as a function of growth and of X-ray dosage.** *Plant Physiol.* 1951, **26**, 19-29, bibl. 7. [Univ. Florida, Gainesville]

As a result of this study of the bioelectric potentials of certain seeds [*Zea mays*, *Triticum vulgare* and *Phaseolus* spp.) the following conclusions can be made : 1. The high yielding seeds have higher bioelectric potentials than those of low-yielding varieties. 2. The bioelectric potential of seeds is zero at dormancy and rises slowly during the first few hours in a humid environment. The potential rises much more rapidly as soon as coleoptile elongation begins. 3. The variation of bioelectric potential with X-ray dosage follows closely the variation of the length of coleoptile with dosage. X-rays, in general, decrease the bioelectric potential of plant seeds and lower their vitality. 4. The bioelectrical potential is not a function of the weight of the seeds.—Authors' summary.

604 SKRIPČINSKIĬ, V. V. and others. [**The dying-off of vegetative organs of perennial and annual grasses at the time of seed ripening.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **79**, 1037-50, bibl. 4.

The characteristic difference between annual and perennial plants, which is apparent at the time of seed ripening, is the complete dying-off of the vegetative organs in annuals and the preservation of these organs in perennials. In 1949, preliminary work was begun on the physiology of perishing in the vegetative organs in annual grasses. Two annuals (Hostianum 237 winter wheat, and Tarašanskaja winter rye), and 2 perennials (cultivated rye and wild rye, *Secale anatolicum*) were grown. The leaf lamina, leaf sheath and internodes were studied in regard to changes in vitality and water content (estimated, visually, by change in colour from green to yellow and by relative turgidity) at different stages of seed ripening, namely, 14 June (beginning of seed setting), 3 July (wax ripeness), 11 July (full ripeness), and 4 August (over-ripeness). For economy of space the data obtained are given (in tables) only for Hostianum 237 and wild rye. The figures are discussed in relation to the transfer of nutrient substances from the vegetative organs to the seeds, with special reference to the fact that the perennials are reproduced by seeds and by vegetative reproduction, whereas the annuals are reproduced by seeds only. Dying-off in perennials is characterized by two phases of perishing in the leaves. The first coincides with the onset of seed setting and takes place in the lowest leaves of the stem, proceeding (as in annuals) from the base upwards; the second coincides with seed filling and ripening, but starts in the upper leaves, and proceeds downwards. It is concluded that this characteristic of the perennials may be useful in selection studies.—M.H.

605 CHOUARD, P. Expérience de longue durée sur le photopériodisme; leçons qui en découlent. [**Long-term experiments on photoperiodism and the lessons which follow from them.**] *Mem. Soc. bot. France* 1950, **96**, 106-146, bibl. 31. [Conservatoire Nat. des Arts et Métiers]

During the years 1944-49 photoperiodic experiments were conducted on more than 300 species of wild and cultivated plants. Observations on 148 of these plants (arranged alphabetically) are recorded briefly in the present paper. A discussion follows on (a) definition of the categories of response to photoperiodism; (b) variation of the photoperiodic response with age and physiological condition of the plants; (c) localization of floral initiation and some physiological problems; (d) stability or reversibility of floral induction; (e) growth phenomena accompanying photoperiodism; and (f) photoperiodism and thermoperiodism in relation to ecology and phenology.—D.B.

606 BLACKMAN, G. E. and WILSON, G. L. **Physiological and ecological studies in the analysis of plant environment. VII. An analysis of the differential effects of light intensity on the net assimilation rate, leaf-area ratio, and relative growth rate of different species.** *Ann. Bot., Lond.* 1951, **15**, 373-408, bibl. 24. [Dept Agric., Oxford]

Since relative growth rate is the product of net assimilation rate and leaf-area ratio (leaf area/plant weight), it follows that if the effects of shading on both net assimilation rate and leaf-area ratio can be expressed mathematically, then the relationship between light intensity and relative growth rate can be derived from the product of the two mathematical expressions. For all the ten species investigated in field and pot culture experiments, it has been found that during the early vegetative phase both the changes in leaf-area ratio and net assimilation rate, over the range of 0.1 to full daylight, are linearly related to the logarithm of the light intensity. In consequence, the relationship between relative growth rate and the logarithm of light intensity—being the product of the two linear regressions—is curvilinear. For species of shady habitats (*Geum urbanum, Solanum dulcamara*) neither the levels of assimilation rate nor the 'compensation-point' values are very different from those of the eight species from open situations (e.g. *Hordeum vulgare, Pisum sativum, Fagopyrum esculentum*). Nevertheless, the intensity at which growth rate is maximal varies between species: it is 0.5 for *G. urbanum*, 0.7 for *Helianthus*, full daylight for *F. esculentum*, while for *Trifolium subterraneum* the calculated value is 1.8 daylight. Such specific differences can be largely accounted for in terms of the differences in leaf-area ratio at the different light levels. On the basis of this analysis of the light factor, a 'shade' plant is best redefined as a species in which a reduction of the light intensity causes a rapid rise in the leaf-area ratio from an initial low value in full daylight: for a 'sun' plant the converse definition holds.—Authors' summary.

607 POTAPENKO, A. I. [**The effect of conditions of nutrition and regeneration on the photoperiodic reaction of plants.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **78**, 595-8, bibl. 3.

The photoperiodic reaction of plants is expressed by the increase or lessening of vegetative growth, depending on the daylength under which the plants are grown. Thus, the photoperiod which retards development simultaneously increases vegetative growth, while the photoperiod which accelerates development lessens vegetative growth. The decrease in vegetative growth which results from the suppressive action of drought is strongly reflected in photoperiodic reaction. For example, under normal growing conditions, *Erigeron canadensis* is neutral as regards photoperiod, but dwarf specimens of this species, which flower and seed under conditions of extreme drought, exhibit long-day reactions when transplanted to an environment with a good water supply. That this effect of drought is not due to individual peculiarities of the plant's inheritance is shown by the fact that when the plants are grown under normal conditions (i.e. neither extreme drought nor excessive water supply) they again exhibit neutral photoperiodism. The author has carried out experiments with *Helianthus annuus* and *Chenopodium album* and discusses their reaction to daylength and varying nutrient conditions in the light of the data obtained from the study of *Erigeron*.—M.H.

608 Chinoy, J. J. and Nanda, K. K. **Effect of vernalization and photoperiodic treatments on growth and development of crop plants. 1. Varietal differences in flowering of wheat and its correlation with length of spike under varying photoinductive and post-photoinductive treatments.** *Physiol. Plant.* 1951, **4**, 209-23, bibl. 41.

Photoinductive and post-photoinductive treatments were given to three varieties of wheat (*Triticum vulgare* var. N.P. 165, N.P. 52, and Punjab C.591), for varying periods and their effects on flowering were recorded. The vegetative period is markedly influenced by the length of the day. The effect is seen even for photoinductive treatments which are of very short duration. There is a graded response to increasing photoperiod. This is suggestive of a quantitative relationship between the photoperiod and the vegetative period. Analysis of variance has revealed highly significant effects of photoinductive and post-photoinductive treatments.—From authors' summary.

609 David, R. and Séchet, J. Nouvelles observations sur la vernalisation du blé et de l'orge. [**New observations on vernalization of wheat and barley.**] *C.R. Acad. Agric. Fr.* 1951, **37**, 45-8, bibl. 3.

The first series of experiments was carried out to investigate the effect of vernalization (at 20°C.) during periods which varied between 8 and 49 days, the date of sowing being the same (23 March, 1950). Control plants were not vernalized. Within the limits of the experiment, an increase in the period of treatment was accompanied by earlier germination, an increase in the average number of ears per tiller and in the percentage of fertile ears. The results have shown that cold is not indispensable to germination and that even treatments of less than 1 month (the classic period for vernalization) favourably influenced germination and seed formation, though to a less extent. In the second series of experiments, wheat and barley seeds were vernalized for the same period (22 days), but the sowing date varied (28 February to 4 April). Control plants were not vernalized. The later the sowing the lower was the percentage germination and the percentage of fertile plants. This was true for vernalized and control plants, but for any given date of sowing the germination and fertility were higher in the vernalized than in the control plants.—D.B.

610 Cavazza, L. Ricerche sull'azione ormonica di sostanze prodotte da alcuni microrganismi sulle piante superiori. [**Research on the hormonal action on higher plants of substances produced by some micro-organisms.**] *Ann. Fac. Agr. Univ. Bari* 1950, **7**, 3-24, bibl. 12, illus. [Ist Agron., Univ. Bari]

Trials were carried out at the above Institute to study the effect of solutions containing extracts of *Aspergillus niger* and *Penicillium crustaceum*, applied to the seed, on germination and first stages of development of higher plants. The plants tested were: *Triticum vulgare* vars Roma and Marzuolo 293, *Ervum lens* var. Altamurana, *Pisum sativum*, *Cicer arietinum* and *Vicia faba* var. *minor*. The seeds of these plants, after 24 hours' soaking in the solutions, were employed in germination and culture tests. Results showed that, by increasing the concentration of the solution, there was an increasing stimulating effect on germination and further development of the plants up to an optimum value, after which the stimulating effect decreased and an inhibitory effect ultimately appeared. It is thought that these extracts include plant hormones as well as toxic substances. Of the plants studied, wheat was the least sensitive, all the Leguminosae reacted definitely, but *V. faba* in a smaller degree. The author is of the opinion that these findings could be applied to treating crop seeds of low germination power.—E.B.

611 Mitchell, J. W. and others. **Plant growth-stimulating hormones from immature bean seeds.** *Science* 1951, **114**, 159-61, bibl. 6. [Fruit and Veg. Crops Div., Plant Industry Bur., US Dept Agric., Beltsville, Md]

Applications of 125 mg. of an ether extract of immature bean seeds were made to the first internodes of bean seedlings. The extract markedly stimulated the elongation of the treated nodes and all the internodes above that treated and also the expansion of trifoliate leaves, compared with untreated controls. Flower development in the treated plants took place 3 to 5 days before that of the controls. The extract had much less effect on relatively mature seedlings with several expanded trifoliate leaves than it had on younger seedlings. The extract had little effect on seedlings when applied to the more mature parts of their stems, nor was the extract translocated to the rest of the plant when applied to the leaves. The most potent extract was obtained from immature bean seeds 3 to 4 mm. long taken from pods 12 to 13 cm. long. No extractable hormones were obtained from mature seeds. The elongation of the first internodes of seedlings treated with optimum doses of indoleacetic acid and seed extract averaged 318 and 810% more than that of untreated controls during 24 hr. from the time of treatment. The seed extract had a systemic growth-stimulating effect when applied in minute amounts to the cotyledons of bean seedlings that had just broken their seed-coats in the process of germinating. The average length of the hypocotyls and 1st, 2nd and 3rd internodes of treated seedlings within 2 to 5 days of treatment averaged 10.9, 48.5, 65.8 and 100% longer, respectively, than the lengths of the comparable parts of untreated plants. The leaf area of the treated seedlings 10 days after treatment was 27% greater than that of the controls.—P.J.B.

612 ZIEBUR, Nancy K. and BRINK, R. A. **The stimulative effect of *Hordeum* endosperms on the growth of immature plant embryos *in vitro*.** *Amer. J. Bot.* 1951, **38**, 253-6, bibl. 8. [Univ. Wisconsin, Madison]

Immature embryos of *Hordeum vulgare* var. Chevron, 0.3-1.1 mm. long at excision, may be cultivated on a control medium containing 12.5% sucrose, minerals, and agar. Improved growth is obtained when *Hordeum* endosperms are placed on the medium surrounding the embryos. By use of this treatment seedlings capable of survival in soil can be obtained from embryos excised at an earlier age than the minimum required in the absence of endosperms. *Hordeum* endosperms stimulate the growth of immature embryos of other genera as well. Nevertheless, coconut milk and malt extract, both of which promote the growth of certain dicotyledonous embryos, have no favourable effect on *Hordeum* embryos. The evidence suggests that active principles in these other two substances are not the same as those in *Hordeum* endosperms. [See also *Fld Crop Abstr.* 3 : 1532]—Authors' summary.

613 WRIGHT, Joyce M. **Phytotoxic effects of some antibiotics.** *Ann. Bot., Lond.* 1951, **15**, 493-9, bibl. 17. [ICI Ltd., Butterwick Res. Labs, Welwyn, Herts.]

The toxicity of a number of antibiotics, coumarin, and 3-indolylacetic acid to wheat, clover, and mustard seedlings has been assessed by a simple germination test. The percentage germination of wheat was not markedly affected by any of the compounds tested although root growth was reduced. Severe inhibition of root growth of the other seeds was usually accompanied by reduction in percentage germination. None of the antibiotics tested was as inhibitory as indolylacetic acid, but most were more toxic than coumarin. The more toxic of the antibiotics were alternaric acid, glutinosin, mycophenolic acid, and gliotoxin. The least toxic were griseofulvin, penicillin, and streptomycin. Higher concentrations of the last antibiotic had an inhibiting effect on the synthesis of chlorophyll.—From author's abstract.

614 GROSSBARD, Erna. **Antibiotics and microbial antagonism in plant pathology.** *Endeavour* 1951, **10**, 145-50, bibl. 13.

The article gives an illustrated account of the progress made in research on the control of bacterial diseases of plants by : (a) the direct application of specific antibiotics to the plant, and, (b) the stimulation, by appropriate manuring, of the growth of micro-organisms naturally present in the soil which produce antibiotics. Although mainly concerned with horticultural crops, examples of the control of diseases of the following field crops are given : mildew (*Erysiphe polygoni*) of beans, root-rot disease (*Phymatotrichum omnivorum*) of cotton and take-all (*Ophiobolus graminis*) of wheat.—K.L.

615 ALLEN, S. E. and SKOOG, F. **Phytotoxicity of imidazoline derivatives and related compounds.** *Plant Physiol.* 1951, **26**, 611-24, bibl. 11, illus. [Univ. Wisconsin, Madison]

The experiments are considered only as a basis for further experimentation. The toxic action of the imidazolines is summarized tentatively as follows : " (1) Surface-active imidazolines are adsorbed on the cell and may prevent its normal function in regulating passage of materials into and from the cell ; (2) portions of the adsorbed compounds may enter the cytoplasm to react with protein and may thus cause irreversible inhibition of respiratory enzymes." The results of limited field tests suggest that imidazoline derivatives may be of practical use for contact killing of plants, particularly of seedling weeds before the emergence of crop plants. —D.B.

616 EAMES, A. J. **A correlation of severity of 2,4-D injury with stage of ontogeny in mono-**

cot stems. *Science* 1951, **114**, 203, bibl. 1. [Bot. Dept, Cornell Univ., Ithaca, N.Y.]

Seedlings of millets (*Setaria italica* and *S. viridis*) vere treated, 45 days after sowing, by painting the ipper surface of 2 leaves of each plant with a 250 opm solution of 2,4-D in water containing 2% of Tween, a wetting agent. A few days after treatnent, nodal swellings appeared at the bases of hose internodes which were elongating at the time of treatment. The greatest degree of swelling ccurred at the 2nd node above the embryonic iode, the swelling at the older 1st node being much ess. The swellings of the nodes above the 2nd iode were progressively smaller towards the apex f the plants. The nodal swellings were much maller in *S. viridis* than in *S. italica*. The equence of nodal swelling was similar to that bserved in dicotyledonous leaves. It is conluded that 2,4-D injury in monocotyledonous tems becomes evident as the tissues continue levelopment, that the extent of injury is dependent n the stage of development at the time of treatnent and that the effect of 2,4-D is only of short luration.—P.J.B.

17 HAMNER, C. L. and TUKEY, H. B. **Chlorophyll inhibition and herbicidal action of 3-(alpha-imino-ethyl) 5-methyl tetronic acid.** *Bot. Gaz.* 1951, **112**, 525-8, bibl. 11. [Michigan State Coll., East Lansing]

Derivatives of tetronic acid have an unsaturated actone ring and in this respect they are similar to ertain coumarin derivatives which inhibit plant rowth. 3-(alpha-imino-ethyl) 5-methyl tetronic cid was tested on maize, wheat and some dicotyleonous plants. There were 2 methods of treatnent: (a) seeds were soaked for 16 hours, generally t a concentration of 1000 ppm, and (b) seedlings, hen 2 to 6 in. high, were sprayed at 1000 ppm. he monocotyledonous plants were especially ensitive. The seedlings emerging from the soaked eed of maize and wheat were entirely lacking in hlorophyll, and root and top growth was inhibited; eserves were exhausted, and the plants died. The prayed seedlings of maize had straw-white leaves ith the texture of tissue paper. Roots and tops ere suppressed and the plants died. Sprayed eedlings of wheat became progressively chlorotic nd died. Anthocyanin pigments were not affected. -D.B.

18 THOMPSON, J. F. and others. **Investigations on nitrogen compounds and nitrogen metabolism in plants. I. The reaction of nitrogen compounds with ninhydrin on paper: a quantitative procedure.** *Plant Physiol.* 1951, **26**, 375-97, bibl. 30. [Univ. Rochester, N.Y.]

his is the first of a group of papers which will ecord investigations on nitrogen compounds and heir metabolism in plants. The work was undertaken not only because of the intrinsic interest of nitrogen metabolism, but even more because it had become so apparent that other vital phenomena would only be fully comprehended when their relations to nitrogen metabolism were revealed. The purpose of the present paper is to describe a rigorous quantitative procedure for the amino acids of plants based on paper chromatography. "The variables involved in the reaction of ninhydrin with amino acids on paper have been individually investigated and finally controlled. The principal variables are: temperature, humidity, access to oxygen, concentration of ninhydrin and the solvent used to apply it to the paper. The conditions under which the ninhydrin reaction may be carried out quantitatively on paper have been established and described and an apparatus for the purpose has been designed. The method prescribed has been compared with others which have been suggested. The quantitative procedure as described is now suitable for application to partition chromatography on paper of those amino acids found in plants."—D.B. From *Herb. Abstr.*

619 THOMPSON, J. F. and STEWARD, F. C. **Investigations on nitrogen compounds and nitrogen metabolism in plants. II. Variables in two-directional paper chromatography of nitrogen compounds, a quantitative procedure.** *Plant Physiol.* 1951, **26**, 421-40, bibl. 25, illus. [Cornell Univ., Ithaca, N.Y.]

This series of papers concern plant physiology in general rather than the physiology of special crops. In this second part of the investigation the variables operating in the chromatography are considered. It is shown that when these variables are brought under control, the ninhydrin reaction on paper may be applied in such a way as to permit the quantitative determination of a large number of amino acids on a single chromatogram sheet. Accounts are given of the separation of amino compounds on paper by 2-dimensional paper chromatography; the variables which affect the quantitative recovery of amino compounds after 2-directional paper chromatography; the standardized chromatographic procedure; a test of the accuracy of the quantitative paper chromatographic method; and the application of the method to the analysis of protein.—D.B.

620 BERNHEIM, F. and others. **The thiobarbituric acid color reaction in plant tissues.** *Amer. J. Bot.* 1951, **38**, 458-9, bibl. 6., illus. [Duke Univ., Durham, N. Carolina]

Thiobarbituric acid reacts with lignin to give a red or orange compound, and with suberized tissue to give, as a rule, an orange or a red-orange compound. The reaction with thiobarbituric acid has been used in a simple method for demonstrating the vascular system in clear whole mounts of roots and stems. Tissues of woody and herbaceous species were examined. The latter included stems and roots of maize, pea, wheat and oat and the potato tuber with wound cork.—D.B.

621 Brown, J. G. and others. **Further notes on the use of flame methods for the analysis of plant material for potassium, calcium, magnesium and sodium.** *Proc. Amer. Soc. Hort. Sci.* 1950, **56**, 12-22, bibl. 1. [Univ. Calif., Davis]

Details are given of the operation of a quartz prism flame photometer. Its use for the routine analysis of leaf material for Ca, Na, K and Mg is discussed. —P.J.B.

622 Cornfield, A. H. and Pollard, A. G. **The use of tetramethyldiaminodiphenylmethane for the determination of small amounts of manganese in plant material and soil extracts.** *J. Sci. Food Agric.* 1950, **1**, 107-9, bibl. 10. [Imp. Coll. Sci. Technol., South Kensington, London, S.W.7]

Where only small amounts of material are available for analysis, e.g. plants from pot experiments, the usual methods for the determination of manganese (oxidation to permanganate and the formaldoxime methods) are not sensitive enough to give accurate results. The formation of a blue colour when 4 : 4′ - tetramethyldiaminodiphenylmethane (' methane base ') and periodate are added to a solution containing manganese has been used for some years for detecting traces of the element. This sensitive reaction has now been applied to the quantitative estimation of the element. It was not possible to stabilize the initial blue colour but, after about 5 minutes, a relatively stable green colour was formed. The intensity of the green was proportional to the quantity of manganese present. " Quantities of manganese of the order of 0.5 μ g. in a final volume of 25 ml. (0.02 ppm Mn) could be determined with ease."—D.B.

623 Weintraub, R. L. and others. **A method for measurement of cell-elongation-promoting activity of plant growth-regulators.** *Amer. J. Bot.* 1951, **38**, 435-40, bibl. 30, illus. [Camp Detrick, Frederick, Maryland]

A technique for measurement of cell-elongation-promoting activity of plant growth-regulating compounds is described. The method makes use of the curvature response of a decapitated, semi-etiolated bean hypocotyl to unilateral presentation of growth-regulator. A unique feature is the application of a small drop of alcoholic solution of the test substance to the region of elongating cells which results in the rapid entry of a known dose and virtually eliminates longitudinal transport as an influential factor.—Authors' summary.

624 Somers, G. F. and Hamner, K. C. **Phototube-type integrating light recorders: A summary of performance over a five-year period.** *Plant Physiol.* 1951, **26**, 318-30, bibl. 7. [US Plant, Soil and Nutrit. Lab., US Dept Agric., Ithaca, New York]

In recent years considerable attention has been given to a study of the relationship between the amount of light a plant receives and its vitamin content. An instrument for recording light under field conditions is described. The instrument is portable ; it can also be transported easily and without serious damage. It is operated by a battery and is, therefore, independent of an external source of electricity. This recorder gives a linear response to sunlight at intensities greater than 100 fc. The readings are closely correlated with the integrated radiant energy values obtained by an Eppley pyrheliometer (an accepted standard for measuring solar radiation).—D.B. From *Herb. Abstr.*

625 Mills, K. S. and Schrank, A. R. **Some effects of decapitation on electrical and elongation phenomena in the *Avena* coleoptile.** *Plant Physiol.* 1951, **26**, 343-52, bibl. 14. [Univ. Texas, Austin]

In order to investigate the effect of auxin on the longitudinal electrical polarity of the *Avena* coleoptile, simultaneous measurements of elongation rates and voltages were made before and after decapitation. A description of the decapitating instrument, devised to diminish mechanical stimulation of the coleoptile, is presented. Decapitation of intact plants results in two decreased, but different, elongation rates which are followed by an increased rate. Elongation rates are used as an index of the functional auxin. No significant effect of decapitation on the orientation or magnitude of the longitudinal electrical polarity was observed. Isolated sheaths gave similar results. The data show that the longitudinal electrical polarity of the *Avena* coleoptile is independent of the auxin-regulated elongation process. Spontaneous variations of the longitudinal electrical polarity are also not directly dependent on the elongation mechanism.—From authors' summary. From *Herb. Abstr.*

626 Todd, J. R. **Effect of altitude on the estimation of ' crude fibre '.** *Nature, Lond.* 1951, **168**, 76-7. [E. Afr. Vet. Res. Organ., Kabete, Kenya]

In the estimation of crude fibre by the Weende method, no provision has been made for the effects of altitude. To determine the effect of reduced boiling temperature on this estimation, ten samples of material of varying fibre content were tested at sea level and at 6200 ft. a.s.l. The material included maize meal, oats, clovers, lucerne, and 4 grass samples. The results are summarized in tabular form, the error involved through altitude being calculated in each case as a percentage of the result obtained at sea level. This percentage error ranged from 21.35 for maize meal to 5.20 for one of the grass samples. Ways of correcting the error are noted.—M.H.

627 GROSSE, B. Die neuen nordamerikanischen und kanadischen Untersuchungen über das Ausnutzungsvermögen von Düngemitteln durch die Pflanze unter Anwendung radioaktiver Substanzen. [**The new North American and Canadian investigations, using radioactive substances, to demonstrate the ability of plants to use fertilizers.**] *Z. PflErnähr. Düng.* 1950, **51**, 139-47, bibl. 25.

MISCELLANEOUS

628 CROWTHER, E. M. **Experimental agriculture.** *Adv. Sci.* 1951, **8**, 236-48.

This is an account of the address given by the author to section M (agriculture) of the British Association meeting at Edinburgh in August, 1951. It reviews the main steps in the development of agriculture during the last 100 years, with particular reference to soil fertility and manuring.—K.L.

629 EDINBURGH School of Agriculture. **Teaching unit guide to field experiments, demonstrations and farm crops.** 1950, pp. 83.

This includes information on experiments in progress at Boghall Farm, Easter Howgate, Castlelaw and Fulford, Easter Bush, and Dryden Mains, with the following crops: fodder-beet, sugar-beet, mangolds, turnips, swedes, kale, wheat, barley, oats, rye, beans and linseed.—K.L.

630 FENAROLI, L. Le introduzioni di semi e piante eseguite dalla Stazione Sperimentale di Maiscoltura nel 1950 (nn. 50001-50334). [**The plants and seeds introduced by the Experimental Station for Maize Cultivation in 1950 (Nos. 50001-50334).**] Suppl. *Ann. Sper. agr.* 1951, **5**, 29-50. [Sta. sper. Maiscolt., Bergamo, Italy]

Among the species introduced were *Zea mays* (mostly from the USA, but also from Holland, Switzerland, Germany, Hungary and Eritrea), and from the USA, *Helianthus annuus*, *Beta vulgaris*, and *Brassica rapa*.—E.B.

631 CAMBRIDGE, National Institute of Agricultural Botany. **The Swedish Seed Association. Organization, methods and results in plant breeding. An address by Å. Åkerman.** 1951, pp. 15. [Swed. Seed Ass., Svalöf]

The author describes the breeding, testing and marketing of new varieties of field crops produced by the Swedish Seed Association at Svalöf. Winter-hardiness, baking-quality and resistance to rust and other diseases are the main factors sought in winter wheat, while earliness in ripening is the character looked for in spring-wheat selections. In winter rye, the main problem is to produce varieties combining short, stiff straw with high yield, and, in Northern Sweden, winterhardiness. Because of the relatively cold winters, no winter oats are grown. Four different types of spring oats (2 black- and 2 white-hulled varieties adapted to Northern, Central and Southern Sweden) form the basic material for cross breeding. Characters looked for in spring barley include earliness combined with stiff straw and high yield for the 6-row types (used mainly for feeding in Northern Sweden); and early ripening, high yield of extract, high-quality malt, uniform grain and even germination for the 2-row types (grown mainly for malting in other parts of the country). Potatoes are grown for food and for industrial purposes and potato breeding aims at producing high-yielding varieties, resistant to disease, with large tubers of high starch content. In flax breeding, selection is for high oil content of the seed (for linseed) or stiff straw and long fibre (for fibre flax). Hemp growing is based on the German variety Schurig and breeding is in progress on the new German monoecious hemp. The breeding of oil crops (mainly winter and summer rape, white mustard and linseed) started in 1938. High yield and oil content of the seeds combined with resistance to diseases and pests are the main aims in oil-crop breeding.—K.L.

632 BUNTING, A. H. **Agricultural research in the groundnut scheme, 1947-51.** *Nature, Lond.* 1951, **168**, 804-6.

This article is based on an address given to the 5th Annual Conference of the Scientific Department, Overseas Food Corporation, held at Kongwa, in August, 1951. The subject is discussed under headings which include crop research and plant protection. [See also *Field Crop Abstr.* 4 : 171]—M.H.

633 STOREY, H. H. **Basic research in agriculture. A brief history of research at Amani, 1928-47.** [n.d.], pp. 24. [E. Afr. Agric. and For. Res. Organ., Nairobi]

This is an account of the main lines of basic research carried out by the East African Agricultural Research Institute, Amani, Tanganyika, over 20 years. The Amani Research Institute has now been merged into the East African Agricultural and Forestry Research Organization with headquarters at Maguga, near Nairobi.—K.L.

634 Keen, B. A. **The East African Agriculture and Forestry Research Organisation. Its origin and objects.** [n.d.], pp. 12.

635 Journal of the Australian Institute of Agricultural Science, **Commonwealth Jubilee Number. Review of progress in agricultural science in Australia (1901-1951).** *J. Aust. Inst. agric. Sci.* 1951, **17**, 42-110.

The Commonwealth Jubilee Number of the Institute's Journal (June, 1951) contains a review of progress in agricultural science in Australia from 1901 to 1951. The following subjects are reviewed with the aid of extensive bibliographies :—(1) The development of agricultural research in Australia, by B. T. Dickson. (2) Contributions of agricultural research in Australia in : (a) soils, by J. A. Prescott, (b) cereals, by S. L. Macindoe, and (c) warm climate crops, by W. A. T. Summerville. (3) Insect pest control, by H. G. Andrewartha. (4) Fungicides and weedicides, by C. J. Magee. (5) Education in agricultural science in Australian Universities, by S. M. Wadham. (6) The Australian Institute of Agricultural Science (1935-1951), by G. de Vahl Davis.—K.L.

636 New South Wales Department of Agriculture. Sci. Bull. No. 72. **Crop, pasture and fruit breeding in New South Wales, 1930-1950.** 1950, pp. 164. [Received 1951]

The more valuable sources of plant introductions detailed in this review are dealt with under the separate crops.—K.L.

637 Corriols, J. Les cultures vivrières dans les territoires relevant du Secteur Soudanais de Recherches Agronomiques. Leurs améliorations. [**The food crops in the territories in the sphere of activity of the Sudanese Agronomic Research Sector. Their improvement.**] *Agron. trop.* 1951, **6**, 412-19.

The principal food crops grown in the Sahel, Sudan and Guinea (French Africa) are reviewed and the possibility of improving them through selection is examined. These crops include *Pennisetum* spp., *Sorghum* spp., *Zea mays*, *Dioscorea* spp., *Oryza* spp., *Manihot utilissima*, *Voandzeia subterranea*, *Vigna catjang*, *Kerstingiella geocarpa* and *Digitaria exilis*. —E.B.

638 Ševčuk, T. N. [**Local varieties of agricultural crops of Trans-Carpathia.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 6, 23-32. [All-Union Inst. of Plant Industry]

In the summer of 1950, the above Institute sent an expedition to the Trans-Carpathian Province to study local varieties of crops and to collect seed. Information is given on the botanical and agronomical characteristics of local types of cereals, oil crops, and *Phaseolus*. The expedition collected 28 samples of local forage grasses and legumes. All the crops are being studied for distribution and seed production in suitable regions of the Soviet Union. —M.H.

639 Tamés, C. Bosquejo del clima de España, según la clasificación de C. W. Thornthwaite. [**An outline of the climate of Spain, according to the classification of C. W. Thornthwaite.**] *Bol. Inst. Invest. Agron.* 1949, **9**, No. 20, 49-123, bibl. 18, illus.

The climates of Spain are classified according to Thornthwaite's conception of potential evapotranspirations, and the results illustrated in four coloured maps. Brief notes are given on the climate of the extra-Iberian Spanish possessions. Climatic data are given for 66 stations.—N.G.S.

640 Graf Marín, A. Climoscopios para el trigo. [**Climoscopes for wheat** (in **Chile**).] *Simiente* 1950, **20**, 43-7, bibl. 3.

A climoscope is a table in which meteorological values are grouped according to the vegetative cycle of the plant being investigated. Before compiling or using a climoscope, the following data must be established : the vegetative cycle of the cultivated plant ; the dates at which the plant pass through each phase of this cycle for a given sowing date ; the moisture requirements of the plant, especially during critical periods ; local precipitation and its frequency. The vegetative phases for wheat are germination, early growth, shooting (the 3-week period before heading), heading, flowering, grain formation and maturation. The most suitable varieties for a district can be determined by using climoscopes. This was demonstrated for one locality where the climoscopically-chosen variety Lincoyán yielded 66% more than Capelli, although the latter is potentially more productive.—N.G.S.

641 Swanson, A. F. **The relationship of rainfall and other climatic factors to crop production in the Central Great Plains.** *Agron. J.* 1951, **43**, 397-400, bibl. 3. [Kansas Agric. Expt Sta., Manhattan]

Data are presented graphically of rainfall, temperature and other climatic factors, by 5-day periods, over a 28-year period from 1921 to 1948 at Fort Hays, Kansas. The implications of these data, in the planning of cropping systems and breeding crop varieties are discussed.—P.J.B.

642 • WALLACE, T. **Soil conditions and mineral deficiencies of plants.** *C. R. Conf. Pédologie Mediterr.* Alger-Montpellier, 1947, 248-66, bibl. 74. [Received 1951] [Long Ashton Res. Sta., Univ. Bristol]

The important factors which operate in producing mineral deficiencies in crops may be grouped under the headings of geochemistry, pedology, the special mineral requirements of individual crops and farming systems. The natural flora also plays an important role, due to differences in the composition and selective feeding powers of various plants. Accumulator plants may be of special importance. Factors controlling the availability of mineral nutrients in soils include pH, relationships between nutrients (including antagonisms, beneficial effects and toxicities), organic matter, soil organisms, water content, oxygen and carbon dioxide contents. These factors are discussed in detail.—From author's summary.

643 LONDON, His Majesty's Stationery Office. S.I. No. 1005. **Seeds, England. The Seeds (Amendment) Regulations,** 1951, pp. 2.

This leaflet cites the regulations which came into operation on 1 August, 1951.—K.L.

644 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. Adv. Leafl. 368, **Insects and mites in farm-stored grain.** 1951, pp. 7.

The prevention of infestation by all 'unwanted animals' is of the utmost importance in storing grain on the farm. The preventive measures outlined in this leaflet include: the use of clean, well-constructed, well-ventilated, watertight, cool and 'rodent-proof' storage buildings; and the keeping of bagged grain in stacks away from walls and off the ground. The grain should be easily accessible, so that it can be kept under observation, and frequently moved. Recently harvested grain should be stored away from old grain and from imported (and possibly infested) grain and feeding-stuffs. Control measures, when infestation has been discovered, include: (a) treatment of grain by (i) fumigation with hydrogen cyanide or a mixture of ethylene dichloride and carbon tetrachloride, (ii) dusts, sprays or smokes of DDT or BHC, (iii) exposure of milling grain to a temperature of 140°F. for a few minutes; and (b) treatment of the storage bins and buildings with DDT or BHC in dusts, sprays or smokes.—K.L.

645 BROWN, E. B. **Plant parasitic eelworms.** *N.A.A.S. Quart. Rev.* 1951, **No. 13,** 12-18. [NAAS, Eastern Province]

Brief notes are given of the weed and crop plant host range of the main groups of plant-parasitic eelworms found in Britain.—P.J.B.

646 EVANS, J. W. **Birds in relation to agriculture.** *Ann. appl. Biol.* 1951, **38**, 728. [Mill Field, Mill Lane, Chalfont St. Giles, Bucks.]

This is a brief general account of the various reports read at the December, 1950, meeting of the Association of Applied Biologists on the harmful activities of certain bird pests. Recommendations were made for the formation of a special body to deal with the problem of bird damage to crops. Various control measures such as bird-scarers, traps and narcotics were mentioned.—K.L.

647 FERGUSON, D. S. **Control of damage to burrowing lobsters and crabs [in Malaya].** *Malay. J. agric.* 1951, **34**, 61-4, illus. [Drainage and Irrig. Dept, Malaya]

Substantial bunds at least 11 yd. wide at the base and with side slopes of about 3 : 1 are usually unaffected by burrowing crustaceans. The edge of the borrow pit from which the bund is formed should be at least 11 yd. from the base of the bund. A mixture of 5 lb. freshly slaked lime in 3 gal. water gave effective control of crustaceans if applied at a rate of 0.25—0.5 gal. per hole. Tuba root [*Derris elliptica*], 2 lb. in 3 gal. water, was also effective but more expensive. Other methods, largely untried, are also outlined.—N.G.S.

648 THOMPSON, H. V. **Rabbits and other rodents.** *Ann. appl. Biol.* 1951, **38**, 725-7, bibl. 7. [Minist. Agric. Infest. Control Div., Tolworth, Surbiton, Surrey]

This is an account of the paper read at the December, 1950, meeting of the Association of Applied Biologists. Experiments have assessed the damage done by rabbits to pastures, arable crops and trees. Research is in progress on the comparative efficiency of the various methods of control in the different environments.—K.L.

649 CHITTY, D. **Rats, mice and agriculture.** *Ann. appl. Biol.* 1951, **38**, 724-5. [Bur. Anim. Population, Univ. Oxford]

This is an account of the paper read at the December, 1950, meeting of the Association of Applied Biologists. A universally safe method of rat control in grain ricks has not yet been found. The available methods of rat control are discussed briefly.—K.L.

650 SOUTH AFRICA Department of Agriculture. Bull. No. 305. **Termites and their control in cultivated areas in South Africa.** By *W. G. H. Coaton.* 1950-1, pp. 28, bibl. 6. [Div. Entomol., Pretoria]

The following 4 groups of termites are dealt with: (a) harvester termites (*Hodotermes, Micro-hodotermes* and *Trinervitermes* spp.), pests of trees, beans, peas, lucerne, groundnuts, wheat oats, teff, etc.; (b) large fungus growers (*Macrotermes* and *Odontotermes* spp.), pests of trees, bulbs and lawns; (c) small fungus growers (*Microtermes*, *Allodontermes* and *Ancistrotermes* spp.), pests of trees, young plants and lawns; (d) carton nest builders (*Microcerotermes* spp.), pests of trees, shrubs and young plants. The most successful eradication measures include: for (a) poisoned baits consisting of chaffed wheat or woody veld grass (*Ehrharta* sp.) treated with a mixture of 1 lb. sodium arsenite or sodium fluosilicate in 8 gal. of water, broadcast at the rate of 4 muid bags [12 bu. approx.] per morgen (2.1165 ac.); for (b) applications of toxic smoke from benzene hexachloride, or white arsenic and sulphur (the latter at the rate of 3 parts to 1 part by weight respectively) or fumigation from petrol, carbon bisulphide and extraction naphtha; for (c) and (d) cultural methods such as the application to the soil, on which the susceptible crop is growing, of humus and dead matter containing chlorophyll. The ploughing in of green-manure crops helps by diverting the termite attack from the growing crop and by increasing the fertility and water-holding capacity of the soil.—K.L.

651 SCOTLAND Department of Agriculture. Adv. Leafl. No. 18 (N.S.). **Fertilizers and crop production.** By *A. B. Stewart*. 1951, pp. 15. [Macaulay Inst. Soil Res., Aberdeen]

A general account is given of the subject with particular reference to Scotland. The subject is dealt with under the following heads: factors affecting response to fertilizers, profitability of applying fertilizers, and fertilizer policy in Scotland.—K.L.

652 GUSEĬNOV, D. M. [**The use of spent gumbrin for increasing the yield of agricultural crops.**] [Russian] *Počvovedenie* 1950, No. 12, 735-45.

Experiments conducted at the Institute of Agronomy and Soil Science of the Academy of Sciences of the Azerbaidjan SSR showed that spent gumbrin, a by-product in the petroleum industry, improves the physical properties of heavy soils, prevents the formation of crust, reduces the evaporation of moisture from the soil, improves conditions of plant nutrition and increases the number of seedlings of cotton and other agricultural crops. The results of trials with spent gumbrin applied to cotton and cereals are reported. —R.P.J.

653 OKLAHOMA Agricultural Experiment Station. Misc. Publ. No. MP-20. **A graphic solution of airplane sprayer problems.** By *J. E. Garton*. 1951, pp. 3.

The graphs can be used to solve any one of the following 4 variables, if the other 3 are known: ground speed of plane, width of swathe sprayed, total nozzle discharge and rate of application.—P.J.B.

654 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. Bull. No. 130. **Threshing and conditioning of seed crops.** 1951, pp. 34.

This bulletin, first published in 1945 (*Herb. Abstr.* 16 : 1217) has been revised by the National Agricultural Advisory Service. It contains up-to-date information on the latest equipment for threshing herbage, root and vegetable seed crops and on the conditioning of seed before storage. Detailed descriptions, aided by diagrams and illustrations, are given of the standard thresher, the combine harvester and the 30 in. seed sheller. Tables are included of adjustments to be made to threshing machines and combine harvesters for threshing various crops.—K.L.

655 MILLINGTON, E. N. **How to make a hand baler.** *K.I.O. Fortnightly* Suppl. 1951, No. 216, pp. 2.

Although this hand baler was primarily designed for baling flax straw in Kenya, it can also bale hay or similar material. The baler (described with the aid of diagrams) consists of a strong crate measuring 4 ft. × 1 ft. 8 in. × 2 ft. 8 in. (inside measurements), with a removable side or front. The pressure is applied by means of two hand levers, one at each end.—K.L.

656 ENGLAND AND WALES, Ministry of Agriculture and Fisheries, National Agricultural Advisory Service. Fm Mach. Leafl. No. 12. **Platform driers for bagged grain.** 1951, pp. 7.

Grain harvested by combine harvesters can be safely dried in thin hessian bags, in batches, using a simple platform drier installation in which a large volume of slightly heated air is forced through the grain. The drier consists essentially of a heater unit, with fan, to provide the warm air, a platform fitted with air ducts underneath and gratings in its top over which the bags of grain are laid. The fan blows warm air into the ducts and up through the bags of grain. The drier is suitable for farms drying from 100 to 300 tons of grain per season. The capital cost is smaller than with most other types of drier.—K.L.

657 ENGLAND AND WALES, Ministry of Agriculture and Fisheries, National Agricultural Advisory Service. Fm Mach. Leafl. No. 13. **Ventilated silo grain driers.** 1951, pp. 7, illus.

An account is given of the equipment needed for the bulk drying of grain in ventilated silos having porous floors. Warm air is blown through the floors and passes upwards through the grain.—K.L.

658 KELLER, E. R. Beiträge zur Technik des landwirtschaftlichen Versuchswesens. II. Über die Anlage von Feldversuchen. [**A contribution to the technique of agricultural experiments. II. The lay-out of field experiments.**] *Schw. Landw. Mh.* 1951, **29**, 209-20, bibl,. 7. [Eidg. Techn. Hochsch., Zürich]

The paper takes into account trials for both field crops and herbage. The following aspects of the problem are discussed: choice of land; size and shape of sampling units and their replication; the lay-out of the plots in Latin square and split plot arrangements, the effect of competition between and within sampling units and the effect of the border.—D.B.

659 IOWA Agricultural Experiment Station. Res. Bull. 380. **Evaluation of various components from a group of experiments with multiple classifications.** By *W. T. Federer.* 1951, 242-310, bibl. 25.

The results of studies on the development and application of methods for combining variance components from a group of experiments are presented.—P.J.B. From *Herb. Abstr.*

REVIEWS AND REPORTS

REVIEWS

660 OOSTING, H. J. **The study of plant communities.** pp. 389, illus., San Francisco; W. H. Freeman and Co., 1950: London; Bailey Brothers and Swinfen, 1950, 22 × 14, 37s. 6d.

This American text book for students has been written with the intention that it should serve as an introduction to plant ecology. Its author, who approaches the subject mainly from the North American angle, has attempted to present the basic information in an interesting manner, the plant community being the basis of the work. The book opens with a consideration of the nature and variation of plant communities and goes on to describe the methods used for distinguishing and describing them, before discussing the factors which limit, maintain and modify local and regional communities. The inter-relationship between organisms and environment are emphasized and a foundation is laid for presenting the concepts of succession and climax. The last section of the book stresses the potentialities of the ecological point of view, its possible applications in range management, agriculture, conservation, forestry and human relations being surveyed.

The book is well illustrated and, in addition to the general references given at the end of chapters, there is a list of 276 cited references, but amongst these references one finds comparatively few that originate outside North America, and few in any language other than English. Tansley's works are not mentioned.—A. G. G. Hill.

661 VAVILOV, N. I. **The origin, variation, immunity and breeding of cultivated plants.** Selected writings translated from the Russian by K. Starr Chester. *Chron. Bot.* 1949/50, **13**, Nos. 1/6, xviii + 366, illus., Waltham, Mass.; The Chronica Botanica Co.: London; Wm. Dawson and Sons, Ltd., 26 × 18, Price $7.50.

The publication in 1935 of the Russian work in 3 volumes on the theoretical bases of plant breeding (of which Vavilov was the editor and principal author) is recorded as having marked the climax of the author's career. Plant scientists will welcome the publishing of this translation, which is made from Vavilov's writings (contained within parts 1 and 2 of the above volumes) on the following subjects: phytogeographic basis of plant breeding; the law of homologous series in the inheritance of variability; study of immunity of plants from infectious diseases; scientific bases of wheat breeding; and a selected bibliography of the basic world literature on the breeding and genetics of wheat. An outline of the author's history indicates the type of experience on which his work was based. At the age of 26 Vavilov studied with W. Bateson at the John Innes Horticultural Institute and with Sir Rowland Biffen at the School of Agriculture, Cambridge, 1913-14. He was appointed professor in Moscow University in 1914, and in 1916 led an expedition to Persia and the surrounding countries to collect cereals. In 1917 he was transferred to Saratov University as professor of agriculture and botany, and in 1921 was appointed director of the Institute of Plant Industry, Leningrad. During the period 1923-31, Vavilov led expeditions to Afghanistan, Abyssinia, China, Central and South America to collect economic plants, which included 26,000 strains of wheat. In 1931 he was the Soviet delegate to the International Congress, held in London, on the History of Science, and was invited to be President of the International Congress of Genetics in 1939. In 1942 (the year of his death) Vavilov was elected foreign member of the Royal Society of Great Britain.

The translator of this selection of Vavilov's published works writes in his preface that Vavilov himself had hoped to translate into English at least part of these contributions for the benefit of his many English-speaking fellow scientists and friends, but this was prevented by his untimely death. "These translations are offered in the hope and belief that those who were not privileged to have known Vavilov may find their scientific experiences enriched, their minds stimulated, and their research energized by better acquaintance with the work and the philosophy of one of the most memorable figures in the history of plant science."

The translator, the editor and the publishers are to be congratulated on the excellent production of this work with its wealth of detail. The reviewer has noted only minor blemishes, the misinterpretation of a hard wheat variety as Gordenforme (which should be Hordeiforme) on pages 286, 310 and 348, and the use of the name Palmyra instead of Pamir, e.g. on pages 197, 199. The bibliographies are given partly in the text and partly at the end of the sections. The indexes of authors and plants cover pages 353-64.—M. Hall.

662 Baldrati, I. Trattato delle coltivazioni tropicali e sub-tropicali. [**Treatise on tropical and subtropical crops.**] pp. 635, illus., Milano; U. Hoepli, 1950, 26 × 18, Ital. lire 3000.

The author, former Director of Colonization in Eritrea, has collected in this book a considerable amount of information on the tropical and subtropical crops of the world. Emphasis is laid on those of Eritrea, Ethiopia and Somaliland. For each crop information is given on history, botany, soil and climatic requirements, cultural methods, harvesting and uses. Vernacular names are given. There are indexes of illustrations and names.—E. Biasutti.

663 Pellegrin, F. Les légumineuses du Gabon. [**The Leguminosae of Gabon (French Equatorial Africa).**] Mém. No. 1. de l'Institut d'Études Centrafricaines. pp. 284, bibl. 38, illus., Paris; Lib. Larose, 1949, 29 × 23. [Received 1951]

This book gives a botanical description, with keys for the determination of genera and species, of 126 genera and 450 species of Leguminosae, with notes on their use, vernacular names and geographical distribution. All the species of Leguminosae so far known in Gabon, and a few not yet mentioned for this region, but found in similar neighbouring areas are included. There are 17 genera of Mimosoideae, 50 of Caesalpinioideae and 59 of Papilionatae. The first two sub-families consist of trees, shrubs and lianas, with the exception of *Cassia* in which there are some herbaceous species. Among the Papilionatae are the following genera, mostly herbaceous species: *Canavalia, Phaseolus, Vigna, Voandzeia, Clitoria, Psophocarpus, Dolichos, Cajanus, Arachis* and *Sesbania*. There is a general index of names.—E. Biasutti.

664 Franklin, Mary T. **The cyst-forming species of *Heterodera*.** pp. 147, bibl. 646, illus., Farnham Royal; Commonwealth Agricultural Bureaux, 1951, 22 × 14, 18s. 6d.

The cyst-forming eelworms are to-day giving rise to wide-spread anxiety on account of the serious economic losses they are causing, especially to growers of potatoes, sugar-beet, brassicas, cereals and other major food crops.

In this authoritative manual, Dr. Mary T. Franklin describes the morphological characteristics, diagnosis and life histories of the various species, the role of weeds in the propagation and survival of these eelworms in the soil, the symptoms and other effects shown by the infected plants, and the chemical, cultural and other practical measures which have been suggested for their control.

665 London, British Commonwealth Scientific Official Conference. **Specialist conference in agriculture. Plant and animal nutrition in relation to soil and climatic factors. Australia, 1949, Proceedings.** pp. x + 490. London; H.M. Stationery Office, 1951.

This contains, in full, the papers noted in *Fld Crop Abstr.* 4 : 588.—K.L.

666 Journal of The Department of Agriculture, Victoria. **Victoria Centenary, 1851-1951.** *J. Dep. Agric. Vict.* 1951, **49,** 297-368.

The Centenary issue of the above journal contains a review of agricultural progress in Victoria from 1851 to 1951. The following subjects of interest to this Bureau are reviewed:—(1) An outline of the development of Victorian crops and pastures—100 years of progress, by J. A. Morrow. (2) A century of dairy farming—a historical sketch, by K. M. Sillcock. (3) The Agricultural Colleges, by C. B. Woodgate. (4) Chemistry's services to agriculture, by F. H. Williams; and (5) Milestones in Victorian agriculture.—K.L.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated by giving a reference to the abstract.

667 **Edinburgh,** Scottish Society for Research in Plant Breeding. Report to the Annual General Meeting, 31 July, 1951. Edinburgh, 1951, pp. 36.

INVESTIGATIONS REPORTED :

1. Oat breeding, for the production of varieties adapted to conditions in different parts of Scotland, pp. 14-15. The characteristics of certain numbered varieties are listed.
2. Barley breeding, p. 16. Tests were carried out in 1950 for types giving prompt germination in 2nd and 3rd generation hybrids.
3. Use of Pestox III systemic insecticide for control of black fly [species not named] on beans, p. 17. Protection is afforded by spraying the foliage [rates not given], but not by spraying the soil around the plants.
4. Sugar-beet research is concerned with the production of a non-bolting strain which can be sown a few weeks earlier than the normal date, p. 30.—M.H.

668 **France,** Ministère de la France d'outre mer. Bull. agron. No. 5. Annales du centre de recherches agronomiques de Bambey au Sénégal. Année 1949. [Annals of the centre for agronomic research, Bambey, Senegal, 1949.] Nogent-sur-Marne, 1951, pp. 62, illus.

An account is given of the activities of the various agricultural stations in French West Africa working on groundnuts, millet (*Pennisetum* sp.), sorghum, maize, rice and other local crops. A chapter (pp. 39-50) gives detailed information on the principal stations, namely: Louga, Nioro-du-Rip, Sinthiou-Malème in Senegal, M'Pesoba in the Sudan, Tarna in the Niger region, Kankan in Guinea, Saria in High-Volta, Ferkessedougou on the Ivory Coast, and Ina in Dahomey. Among the investigations reported are the following:

1. Groundnuts. Selection and hybridization. The new strains, creeping and erect, are higher yielding than the common varieties, pp. 5-12. Multiplication. The yields of several strains from the first and second multiplication is given, pp. 24-38.
2. Millet (*Pennisetum* sp.). Trials with the variety Sanio 165 gave excellent results. A spacing trial with the varieties Souna and Sanio 165 showed that the yields obtained with spacings of 0.8 m. × 1 m. and 1 m. × 1 m. are practically equivalent being respectively 24 and 22% higher than the yield obtained with the spacing 1.2 m. × 1 m. The spacing 1 m. × 1 m. is preferable because it allows the use of the cultivator in both directions, pp. 12-14.
3. Agronomic studies of the soils of Senegal, pp. 15-23. [See *Fld Crop Abstr.* 2 : 1039]
4. The parasites of groundnut seed. Influence on sprouting. Seed treatment, pp. 51-62. [See Abs. 463]—E.B.

669 **Belgian Congo.** Institut National pour l'Étude Agronomique du Congo belge [INÉAC]. Rapport annuel pour l'exercice 1950. [Annual report for 1950.] Gembloux, 1951, pp. 392.

INVESTIGATIONS REPORTED from various INÉAC Stations :

1. Climatical studies, pp. 70-83 and 382.
2. Rice. Control of *Zonocerus variegatus* with HCH, p. 85. Selection, multiplication and cultural trials, pp. 169-70. Varieties and varietal trials, pp. 179, 276, 301 and 332.
3. Groundnuts (*Arachis hypogaea*). Control of *Heteroligus meles* and *Adoretus* sp. with lead arsenate and HCH, p. 85. Seed treatment, p. 101. Selection and multiplication, pp. 170-1, 293, 315. Varieties and varietal trials, pp. 179, 266, 283, 316, 331, 350-2 and 372. Trials to improve germination, p. 317. Trial on sowing depth, p. 331, and on sowing date, p. 352.
4. Cotton. Control of *Helopeltis bergrothi* by uprooting the affected plants and destroying the larvae, p. 94-5. Chemical control of *Lygus* sp., p. 100. Selection, hybridization and multiplication, p. 285-8, 308-10 and 327. Varieties and varietal trials, pp. 289-90, 295, 303, 310 and 328-9. Cultural trials, pp. 295-6 and 311. Crop rotations, pp. 296-300 and 304-5. Intercropping with gourds as a cover crop, pp. 291.
5. Maize. Control of *Calandra oryzae* in storage with DDT and HCH, pp. 98 and 102. Selection, hybridization and multiplication, pp. 165-6, 216-17, and 312-13. Varieties and varietal trials, pp. 266, 292-3, 314, 330-1, 353, 372 and 378. A trial to establish the best distance between maize plants and the water table, pp. 166-7. Trial on sowing date, p. 354. Spacing trial, p. 354. Effect of cultural methods on yield, p. 356.
6. Effect of soil fumigation with DD Shell to control "Shimbu" on the yield of maize, *Phaseolus* sp. and cotton, pp. 99-100.
7. Riboflavin, protein and fat content of food crops, pp. 157-8.
8. Studies on crop rotations, pp. 161 and 163.
9. *Coix lachryma-jobi*. Selection, p. 164. Varieties, p. 266.
10. *Phaseolus* spp. Selection and multiplication, pp. 171, 218-20. Varieties and varietal trials, pp. 218-20, 251-2, 265-6, 294, 332 and 379. Trial on sowing date, p. 332.
11. Soyabean. Selection, pp. 171-2. Varieties and varietal trials, pp. 172, 179, 265, 319, 356, 371 and 379.
12. *Dioscorea* spp. Multiplication and varieties, p. 173.
13. *Manihot* spp. Selection and hybridization, pp. 174-5 and 320. Chemical analysis, p. 175. Varieties and varietal trials, pp. 174, 252, 266, 320, 333 and 372. Cultural trials, pp. 252-3 and 320-2.
14. *Sorghum* spp. Selection, p. 217. Varieties,

pp. 266, 355 and 371. Yield of varieties in relation to spacing, pp. 322-3.
15. *Eleusine* sp. Selection, p. 218. Varieties, p. 378.
16. *Amaranthus caudatus* and *A. edulis*. Selection, p. 218.
17. Sunflower (*Helianthus annuus*). Varieties and varietal trials, pp. 222, 322, 345, 357 and 380. Intercropping with maize, p. 380.
18. *Urena lobata*. Yields of varieties. Crop rotation trials showed that *U. lobata* gives economic returns only when it is grown at the beginning of the rotation. Cultural trials, pp. 279-81.
19. *Voandzeia subterranea*. Varietal trials, p. 352.
20. *Pennisetum typhoideum*. Spacing trial, p. 355.
21. Effect of superphosphate manuring on the yield of *Phaseolus* sp. and maize, p. 370.
22. Wheat. Selection, p. 377.—E.B.

670 **Gold Coast.** Annual Report of the Department of Agriculture for the year 1949-50. Accra, 1951, pp. 13, 2s.

INVESTIGATIONS REPORTED :
1. Fertilizer and varietal trials on rice, pp. 6 and 12.
2. Observation trials on sorghum varieties, p. 7.
3. Groundnut varietal trials, pp. 7 and 12.
4. Observation trials on the fibre crops, *Corchorus capsularis*, *C. olitorius*, *Hibiscus cannabinus*, *H. sabdariffa*, and *Urena lobata*, p. 7.
5. Varietal, spacing and yield trials on soyabeans, p. 7.
6. Control of maize stalk borer by DDT, p. 11.
7. Breeding, selection and testing of guinea corn and maize varieties, p. 12.—K.L.

671 **East Africa.** Annual Report of the East African Agriculture and Forestry Research Organisation. Nairobi, 1950, pp. 57.

[See *Fld Crop Abstr.* 3 : 1572]

INVESTIGATIONS REPORTED :
1. Investigations into virus diseases of cassava, groundnuts and maize, pp. 18-25.
2. Experiments on the nutrition of maize with N, P and K in culture solutions, pp. 35-7.
3. Fertilizer trials with sorghum, bulrush millet, cotton and maize, pp. 41-5.—K.L.

672 **Kenya** Department of Agriculture. Annual Report 1949. Vols. I and II, Nairobi, 1951, pp. 29 and 89.

[See *Fld Crop Abstr.* 3 : 1574-5]

Vol. I is an economic review of the year's agriculture : Vol. II covers experimental work by the research departments. The page numbers below refer to Vol. II.

INVESTIGATIONS REPORTED :
1. Control of chafer grub (*Schizonycha* sp.) on sunflower and maize by BHC, p. 2.
2. Control of stalk-borer (*Busseola fusca*) on maize, with DDT and Derrisol, p. 3.
3. The use of pyrethrum powder, BHC, and DDT to protect maize in storage, p. 3.
4. Experiments on the availability of phosphatic fertilizers to cereals and the effects of, (a) increasing concentration of fertilizers, and (b) methods of placing on relative " root-solubility", pp. 14-18.
5. The release of the 3 new wheat varieties 294.M.7.C.1.C., 318.0.3.B.2, and 291.J.1.I.1., pp. 23-4.
6. Rate of seeding trials with wheat, p. 29.
7. Release of the new barley variety Mariout, p. 30.
8. Barley varietal trials, p. 30. The Australian varieties Prior, Research and Maltworthy yielded well at low, medium and high altitudes.
9. Yield and spacing trials on semi-dwarf varieties of sunflower, pp. 31-2.
10. Soyabean varietal trials, p. 32.
11. Hybrid maize varietal trials, pp. 33-4.
12. Sorghum varietal trials, p. 34.
13. Rotation trials to test the effect of wheat following pyrethrum as compared with wheat following grass and wheat following wheat.—K.L.

673 **Northern Rhodesia** Department of Agriculture. Annual Report for the year 1950. Lusaka, 1951, pp. 18, 1s.

[See *Fld Crop Abstr.* 4 : 606]

INVESTIGATIONS REPORTED :
1. The comparison of contour ridge cultivation with unprotected mound cultivation as shown by the yields of maize grown under the 2 systems, p. 15.
2. Velvet bean, kaffir-corn, maize, cassava, finger millet, wheat and oat varietal trials, p. 15.
3. Fertilizer trials on maize, p. 15.
4. Comparison of the yields and resistance to disease of Southern Rhodesian Double Hybrid maize and locally selected Hickory King, p. 15.
5. Eight course rotational trials comprising tobacco, groundnuts, maize, and grass, p. 16.—K.L.

674 **Nyasaland Protectorate**. Report of the Department of Agriculture for the year 1949. Pt. II. Experimental Work. Zomba, 1951, pp. 23, 2s. 6d.

INVESTIGATIONS REPORTED :

Tung Experimental Station, Cholo
1. The two intercropping trials of field crops with tung trees [see *Fld Crop Abstr.* 4 : 608] have continued, p. 7.

Likuni and Lizasadzi Experimental Stations
2. Fertilizer trials with NPK on maize, p. 13.
3. Maize spacing trials, p. 13. Spacings of 3 ft. × 3 ft. with 3 seeds per hole were found to be best.
4. Experiments on bush eradication on arable and grazing land by means of Agroxone, p. 14.

5. Leaf plucking experiment on cowpeas, p. 14. Plucking the growing point of the plants produced 11% reduction in yield.—K.L.

675 **Uganda Protectorate** Department of Agriculture. Record of Investigations No. 1, for the period 1st April, 1948, to 31st March, 1949. Entebbe, 1950, pp. 91. [Received 1951]

[See *Fld Crop Abstr.* 4 : 609]

INVESTIGATIONS REPORTED :

1. Time-of-harvesting trials and mosaic-resistant variety trials with cassava. Results are tabulated pp. 11 and 16.
2. Yield trials of 5 Eastern Province *Eleusine* varieties and the local Buganda finger-millet, p. 11.
3. Spacing trials with groundnuts to observe the spread of rosette virus and to study how it may be controlled in a dense plant population, pp. 11-12.
4. Comparison of the oil yields of 5 varieties of American soyabeans, p. 12. Only the variety Ogden was of equal merit with former importations.
5. Bean varietal trials, pp. 12-13.
6. Varietal trials with maize to select early maturing varieties, p. 13. The most promising varieties were K8 and K3.
7. Control of pasmo disease (*Sphaerella linorum*) of linseed by applications to the seed of an organo-mercurial dressing, p. 23.
8. Control of *Lygus* on cotton by means of DDT and BHC sprays and dusts, and pyrethrum dust. Results are tabulated, pp. 27-9, 65, and 83.
9. Permanent manurial experiment on cotton following *Mucuna* as green manure, p. 69. Dressings of more than 10 ton per ac. of farmyard manure tended to decrease yields.
10. Manurial trials with *Eleusine*, groundnuts and sorghum, pp. 69-72.
11. Fertilizer trials on cotton, pp. 71-2.
12. Comparison of the effects on soil fertility of, (a) continuous cultivation with no manure, (b) continuous cultivation with 10 ton/ac. farmyard manure, (c) continuous cultivation with applications of 2 cwt./ac. $(NH_4)_2SO_4$ and 4 cwt. rock phosphate, and (d) alternate cultivation of 3 yr. cropping and 3 yr. resting, p. 87.
13. Trials to determine the effect on yield of all combinations of a root/straw/legume rotation, p. 87.—K.L.

676 **Zanzibar Protectorate.** Annual Report of the Department of Agriculture 1949. Zanzibar, 1950, pp. 64.

INVESTIGATIONS REPORTED :

1. Cassava varietal trials, p. 14.
2. Trials of high-yielding and high-tillering rice varieties, p. 17.
3. Effect of applications of $(NH_4)_2SO_4$ on yields of cotton, p. 19.
4. Fertilizer trials on sunflower, p. 19.
5. Fertilizer trials on cassava, maize, rice and sorghum. Results of experiments are tabulated, pp. 20 to 25 and 48 to 55.
6. Effect of applications of minor elements on maize, pp. 24 and 53. Mixtures of Fe, Mn and Cu caused a significant increase in yield of 141 lb. per ac. A mixture of Mg, B and Zn, caused a decrease of 116 lb. per ac., while a mixture of Ni, Co and Mo caused no significant effect on yield of maize.—K.L.

677 **Sarawak** Department of Agriculture. Annual Report for 1950. [n.d.], pp. 47. [Received 1951]

Hibiscus sabdariffa, p. 15. With heavy manuring, it was found possible to produce long straight stems suitable for fibre production.—N.G.S.

NEWS ITEMS AND NOTES

Great Britain

678 AVERAGE CROP YIELDS. Replying to a question in the House of Commons, the Minister of Agriculture, Sir Thomas Dugdale, stated that the average yields per acre of the main crops were approximately as follows : wheat, 20 cwt. ; barley, 19 cwt. ; oats, 18 cwt. ; and potatoes, 7 tons. He further stated that dressed carcase yields of beef and mutton reached 2.5-3 cwt. per acre per annum from the finest pastures and about 0.125 cwt. per acre per annum from typical mountain grazing. Average grassland yields about 1.5 cwt. of meat per acre per annum. *Hansard* 951, No. 203.—N.G.S.

679 OLD-ESTABLISHED FIRM'S PUBLICATION. The recently published catalogue of Messrs. Dunns Farm Seeds, Ltd., 1951, deals chiefly with autumn cereals and forage crops. Among the many articles is one by Sir George Stapledon, F.R.S., who is the firm's scientific adviser. "Farming for today and the future" is the title of his article. Sir George predicts : "Many, many years will have to go by before increased production and decreased population create a condition when it would be possible adequately (and in all respects) to feed every single person inhabiting this planet." "Wheat," by Roland Dudley, former chairman of the National Institute of Agricultural Botany, is another article of considerable interest. Professor E. T. Jones, Director of the Welsh Plant Breeding Station, Aberystwyth, writes on "winter oats." Particularly valuable is the advice on dealing with pests on wheat and autumn-sown crops, given by J. F. H. Cronshey, of the Research Station, Fernhurst.—Extract from the *Bridgwater Mercury* August, 1951.

680 Sugar-Beet Pulp Blocks. Sugar-beet pulp is being produced in blocks at the Wissington factory. The blocks are 12.5 in. x 9 in. x 4.5 in. and weigh 8.5 to 10.0 lb. The blocks occupy much less space than the equivalent weight of pulp in bags: their cost is about £2 12s. 6d. per ton less than that of bagged sugar-beet pulp. On soaking in water for 10 min. the blocks disintegrate, each absorbing about 3 gal. of water. *Brit. Sug. Beet Rev.* September, 1951.—K.L.

Guatemala

681 Weights and Measures. Tables and conversion factors for converting local weights and measures into other local values and also into the metric system are given in *Revista Agricola, Guatemala* Vol. 1 (3a epoca) Nos. 3 and 4, pp. 11-14.—N.G.S.

India

682 Cotton Conference. The following papers were amongst those read at the 15th Conference of the staff of the Technological Laboratory, held in January, 1951: Studies in the quality and agronomic characters of Jayawant [cotton] grown with different doses of nitrogen in the form of groundnut cake and without a basic dose of farmyard manure to the previous crop, by H. R. Nayak; The influence of spacings and seed rates on the economic characters and fibre properties of cotton, by K. G. Deo; Study of the variation in fibre-properties of Co. 4 by sowing at 15-day intervals with three spacings, by K. S. Marar; Effect on fibre properties of sowing dates and manurial treatments under well-irrigated conditions (1949-50), by L. R. Jambunathan; Effect of irrigation on the fibre properties and other characters of K5 and K1, by K. S. Marar; Study of fibre-properties of hirsutums grown in Malwa, by K. V. N. Nayar. Abstracts of these papers are contained in *Indian Cott. Gr. Rev.* July, 1951.—N.G.S.

Pakistan

683 Agricultural Development. Out of the total expenditure of Rs.2600 million allocated to the 6-year development plan, Rs.820 million will be spent on agriculture. The greatest part of this will be spent on irrigation, while allocations will also be made for land settlement, fertilizer subsidies, seed improvement, mechanization, "anti-water lodging measures," animal husbandry, fisheries and miscellaneous agricultural schemes. Targets under this scheme involve increases in production of up to 800%. *Co-op. Market. Rev.* January 1951.—N.G.S.

Sudan

684 Dr. A. H. Bunting who held, until recently, the post of chief scientific officer with the Overseas Food Corporation, and who was responsible, from the inception of the groundnut scheme in Tanganyika in 1947, for the agricultural research services there, has been appointed to the Research Division of the Sudan Ministry of Agriculture. He is to be in charge of a new research station for investigating the agricultural potentialities of the central rainlands area of the Sudan. *Nature, Lond.* November, 1951.—M.H.

Sweden

685 New Insect Pest of Wheat in Sweden. The first evidence of *Aelia rostrata* damage to wheat in Sweden was found in 1950. In tests of the baking quality of *A. rostrata*-damaged wheat, results indicated that where not more than 15% of the kernels were injured, a good baking quality could be expected. *A. rostrata* is not yet considered a serious problem in Sweden, but in view of the damage done to wheat by this pest in such countries as Spain and North Italy, a watchful eye will be kept on its progress. For the present, the Swedish Flour Company has declared that all samples of wheat containing more than 15% of damaged kernels must be tested for baking quality before being sold. *Lantm. Svenskt Land* September, 1951.—P.J.B.

686 Autumn Wheat or Spring Wheat? According to the area inventory made in Sweden on 1 June, 1951, the autumn wheat area amounted to 148,000 ha., the lowest figure ever recorded with the exception of that for 1947, which was due to the abnormally heavy winter killing. The spring wheat area was 180,000 ha., a record figure which has never been attained previously. The rye area, the lowest hitherto, amounted to only 98,000 ha. From the point of view of the country and of the farmers themselves an increase in autumn wheat cultivation would be advantageous. *Lantm. Svenskt Land* August, 1951.—R.P.J.

Uruguay

687 Land Reclamation. An illustrated account is given in the supplement to the *Boletin del Instituto Nacion al de Colonizacion* Vol. 2, No. 20, Sept. 1951, of the progress of the project for reclaiming 500 ha. of eroded soil in Inmueble 400, San Jacinto, Department Canelones. The work is being carried out in 6 stages:—terrace draining; cultivation of a forage crop, using fertilizers; grazing, once the forage is established; withdrawing the stock, allowing the forage to grow and then ploughing in as a green manure; dividing the land into blocks for the future colonists; colonizing under a technical administration. The terracing is based upon a survey of the contours, and the main drainage channels follow the natural lie of the land. The dimensions of the drainage system are based upon calculations of the water load. The channels are carpeted; up to the present *Chloris gayana* has been used in the summer and *Lolium multiflorum*, Seleccion Estanzuela 284, in the winter. Some 200 ha. have already been terraced, and ploughing has been started on some of this area.—N.G.S.

USA

688 Breeding Rust Resistant Wheats in East Africa. In the endeavour to develop wheat varieties resistant to race 15B of stem rust in the United States, a number of selections of wheat originating in Kenya Colony are under test, some of which have shown real resistance to this race of stem rust. Wheat breeders in Kenya have to cope with three types of rust, viz., yellow rust, stem rust and leaf rust, as compared with only the stem and leaf rusts found in the U.S. It is suggested that as Kenya

wheats have been found of value in rust-resistance breeding work in the U.S., wheats bred in the U.S. for resistance to races of stem rust other than 15B, and to leaf rusts, may be of value to breeders in Kenya. A number of wheat hybrids developed at the North Dakota Agricultural Experiment Station have already been sent to Kenya for use in breeding for resistance to leaf rust. *North Dakota Agric. Exp. Sta. Bimonthly Bull.* May-June, 1951.—P.J.B.

USSR

689 STEPPE AND DESERT REGIONS. An account is given of the scheme for establishing hydro-electric stations, canals and irrigation systems in the Soviet Union. The plan is to develop areas extending along parts of the Don and Volga rivers from the Black Sea/Azov northern coasts to Stalingrad and Kuĭbyšev, with extensions southward from Stalingrad to the north-west coast of the Caspian Sea, and also across parts of the Kara Kum desert and the Ust Urt Plateau to the Aral Sea, utilizing the waters of the Amu-Dar̃ja. It is anticipated that the work will revolutionize the agricultural industry of the regions concerned. V. A Kovda, *Priroda, Moskva* 1951, No. 4, 9-20.—M.H.

FIELD CROPS

CEREALS

WHEAT

690 MOSCHINI, E. Le semine ritardate di frumento e l'impiego delle varietà marzuole. [**The delayed sowing of wheat and the use of March varieties.**] *G. Agric. Domen.* 1951, **61**, 375.

Advice is given for the late (December-March) sowing of wheat in Italy, in the event of the usual autumn sowing not having taken place, or having failed.—E.B.O.

691 THORPE, H. C. **A note on the release of some new cereal varieties—III.** *E. Afr. agric. J.* 1951, **17**, 88-9, bibl. 1. [Dept Agric., Kenya]

Brief notes are given on the following wheat varieties released for sowing in Kenya in the 1951-52 season: Nos. 360.H., 337. BE. 2. F.2., 338.AA.1.A.2., 184. P.2.A.1.A., 350. AD.9.C.2., and 341 F.2.D.1.—K.L.

692 LOVČIKOV, I. S. [**Spring wheat Arnautka Nemerčanskaja**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 5, 70-1. [Sta. Comm. Var. Tr. Grain, Oil Crops and Herb. Plants]

The spring wheat variety Arnautka Nemerčanskaja was bred at the Nemerčanskaja Plant Breeding Station, Vinnitsa province, from a local hard wheat of the Hordeiforme variety. It is well suited to the diverse soil-climatic conditions of the Kamenets-Podolsk, Volyn, Rovno, Kiev, Poltava and Vinnitsa provinces where its yields are considerably higher than those of the hard wheat Melanopus 69 or of the soft wheat Lutescens 62. The average yield (ctr/ha.) of Arnautka Nemerčanskaja grown after a clover ley was 15.9, after sugar-beet 10.3 and after maize 7.7. In the western provinces of the Ukraine the period from germination to wax ripeness was from 91 to 115 days, in the Kiev and Poltava provinces from 76 to 90 days. The new variety's resistance to lodging is above average; it does not shed easily. It is slightly more susceptible than Melanopus 69 to attack by *Ustilago tritici*. The grain is large and well-filled, with an absolute weight of from 33 to 43 g., i.e. on the average from 3.4 to 8 g. higher than in Melanopus 69.—R.P.J.

693 TORPE, N. V. Resultat från försöken med höstvete vid Sveriges Utsädesförenings Värmlandsfilial. [**The results of trials with winter wheats at the Värmland Branch Station of the Swedish Seed Association.**] *Sverig. Utsädesfören. Tidskr.* 1951, **61**, 207-23.

Meteorological data are given for the trial years between 1940-50, together with the yields and other agronomic data from trials with Sammet, Svea II, Pärl I, Pärl 2, Thule III, Ergo, Gluten, Berg, Robur, Virtus, Ög 01440, Vrm 01251, Vrm 01252 and Aros winter wheat varieties. Sammet was used as a control variety.—P.J.B.

694 KUZJMIN, V. P. [**Babaevka winter wheat.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 7, 59-62, [Babaeva Agric. Expt Sta., Šortandinsk]

Work on winter wheat has been started recently at the above Station. Conditions in this region of the steppe (uniformly low temperature and low moisture supply with abundant autumn sunshine) ensure a hardening of the wheat plants before the onset of winter. Under these conditions winter wheat should ripen early in August, that is, in not more than 90 days from the beginning of germination in the spring. Features which are desirable in the crop are: (1) long vernalization stage; (2) short subsequent developmental phase; (3) a xerophilic character (from autumn to spring); (4) intensive growth during the light stage of development; and (5) a mesomorphous character from the shooting to ripening stage. By means of selections (based on the variety Lutescens 4) the type Babaevka has been produced which, it is claimed, is suitable for the severe continental conditions of the steppe.—M.H.

695 ÅKERMAN, Å. and others. Undersökningar av kvaliteten hos 1950 års brödsädesskörd. [**Investigations of the quality of the 1950 season bread-cereal crops.**] *Sverig. Utsädesfören. Tidskr.* 1951, **61**, 224-53.

The results are given of the purity, moisture content, hectolitre weight, diastatic activity and baking quality of winter and spring wheats and rye from 14 regions in south and central Sweden. Data are also given of the varieties included in the samples from the different regions. Of winter wheats, the largest number of samples were from Eroica, closely followed by Ergo. Odin, a new variety, comprised 6% of the samples and is expected to be grown more widely in the future, particularly in west and middle Sweden. Among spring wheats, Kärn comprised 47% of the samples, followed by Diamant, with 17%. Kärn has gained ground largely at the expense of Diamant, which comprised 27% of the samples sent in in 1949. Kung rye continues to be the most widely grown variety and comprised 59% of the samples sent in, followed by Petkus, with 12%.—P.J.B.

696 BROEKHUIZEN, S. and DE MIRANDA, H. De bakwaarde van de in Nederland verbouwde tarwerassen. [**The baking quality of wheat varieties grown in the Netherlands.**] *Landbouwk. Tijdschr.* 1951, **63**, 776-88, bibl. 11, English summary p. 788. [Graan-, Meel- en Broodonderz., Cent. Inst. Voedingsonderzoek T.N.O., Wageningen]

Investigations were made during 1947, '48 and '49, into the baking quality of 14 varieties of winter wheat and 8 of spring wheat grown in 4 regions of the Netherlands. Determinations were made of the bread volume, protein content and gluten strength (by Chopin's alveogram method) of the wheats. Baking quality depended very largely on climatic conditions at the times of flowering and grain ripening. In 1947, with winter wheats, high temperatures shortly after flowering decreased the number of grains per ear and raised the protein content and gluten strength of the remaining grains. In 1948, wet, cold weather at flowering time reduced the number of grains per ear, and also lowered the protein content and gluten strength of those remaining. In 1949, favourable conditions in spring and at the time of flowering resulted in very high grain yields, but the protein content of the grain was about 1.5% lower than in 1947. Grain yields in 1947, '48 and '49 for Juliana winter wheat were 3220, 4190 and 5400 kg. per ha. and 1000-grain-weight 41.7, 43.9 and 44.7 g., respectively. The protein content of spring wheats in 1949 was the same as in 1947 but the gluten strength was somewhat lower. It is concluded that, in general, high grain yields and good gluten quality do not go together under conditions in the Netherlands. Considerable variations were found in the baking quality of different varieties. The winter wheat Alba had a low protein content, but a high bread volume; Juliana and Staring also had a high bread volume. Among spring wheats Koga had the highest bread volume, followed by Blanka. Two new varieties, the winter wheat Minister and the spring wheat Peko, were very poor in baking quality.—P.J.B.

697 HINTZER, H. M. R. De bakeigenschappen van kruisingen van tarwe en rogge (*Triticale*). I. Enige eerste onderzoekingen aan materiaal van oogst 1949. [**The baking quality of wheat × rye crosses (*Triticale*). I. Some investigations of material from the 1949 harvest.**] *Landbouwk. Tijdschr.* 1951, **63**, 789-98, bibl. 8, English summary pp. 797-8. [Afd. Graan-, Meel- en Broodonderzoek Cent. Inst. Voedingsonderzoek T.N.O., Wageningen]

The results are given of determinations in the Netherlands of a number of characters, including water-, ash- and protein-content, 1000-grain-weight, gluten strength and baking quality, of Petkus rye, Carsten's V wheat, and 3 wheat × rye crosses: Carskus (Carstens V × Petkus), TR 287/49 and Lokus (Lovink × Petkus). Carskus grain had a protein content of 17.2%, compared with 6.9 and 9.5% for Petkus and Carsten's V. The 1000-grain-weight of the 3 wheat × rye crosses was lower than that of the wheat, but the flour yield was almost the same. The gluten content of Carskus was considerably higher than that of its parents and the bread volume of Carskus was 4370 ml. per kg. of flour, compared with 3010 and 3740 ml. for Petkus and Carstens V, respectively. The alpha-amylase content of the crosses was extremely high and this may increase their tendency to sprout in the field. —P.J.B.

698 SOUSA FRANCO, A. F. de. Subsídio para a caracterizaçao dos trigos no estado de planta nova. [**Study of the characters of wheats in the young state.**] *Melhoramento* 1951, **4**, 5-65, bibl. 10, illus., pl. 7, English summary p. 62.

Studies were made of 12 varieties of *T. vulgare*, 9 varieties of T. *turgidum* and 14 varieties of *T. durum* and brief descriptions are given of each of these. Keys are given for the identification of these varieties in the young state, based on morphological and anatomical details.—N.G.S.

699 JONARD, P. and KOLLER, J. Les facteurs de la productivité chez le blé. [**Factors of productivity in wheat. Results obtained in 1948 and 1949.**] *Ann. Inst. nat. Rech. agron.* Sér. B. 1951, **1**, 256-76, bibl. 16. [Sta. Cent. Génét. Amélior. Plantes]

This is a preliminary paper advancing the hypothesis that the principal factor determining productivity is not the same for all varieties of wheat. For example, in Yga and Marival the principal factor is number of ears per square metre, in Vilmorin 27 it is tillering capacity and fertility of the ear, in Hybride 40 it is size of grain, and in Hybride de Bersée, the number of grains per ear. Other factors contributing to yield were weight of grains per ear and the 1000-grain-weight.—D.B.

700 LOISIL, L. Le classement des blés durs de la récolte 1950 au Maroc. [**The classification of hard wheats from the 1950 harvest in Morocco.**] *Terre maroc.* 1951, **25**, 293-6.

The Commission for hard wheats of French North Africa has established 3 grades for hard wheat, based mainly on the hectolitre weight (a minimum of 82 kg. for grade 1, 80 kg. for grade 2 and 78 kg.

for grade 3) and also on freedom from defects and disease. Many samples of the principal selected hard wheat varieties of Morocco were examined and classified in these 3 grades. 31% of the samples were placed in grade 1, 25% in grade 2 and 17% in grade 3. The remaining samples were of a lower quality. Samples of the same variety varied with the year and the region of cultivation. Most of the samples of the varieties Ouled Youssef, Caïd Eléize and Selbera were placed in grades 1 and 2. Only half of the samples of the variety Zeramek were placed in the first 2 grades. The 4 named selected varieties are widely grown in Morocco. Most of the other varieties examined are still under trial.—E.B.O.

701 TONINI, G. Lo stato di maturazione dei semi di frumento. [**The state of maturation of wheat seeds.**] *Ital. agric.* 1951, **88**, 778-80.

A Mentana wheat crop was harvested in 6 different lots, at 7 day intervals, the first lot on 11 May, 4 or 5 days after fertilization had taken place, when not all the caryopsides had formed on the spike, and the last lot on 15 June, 1948, when the moisture content of the grain was 9 to 10%. The germination percentage of the caryopsides in the laboratory was 88, 94 and 96, respectively in the first 3 lots harvested, and 100 in the last 3 lots. The first lots had also a lower germination energy than the last lots. The germination percentage of the first lots when grown in plots was even lower than in the laboratory, and the plants they produced were weaker, smaller and yielded less than the plants obtained from the last lots of seeds.—E.B.O.

702 BONVICINI, M. Semente di grano senza lesioni. Comunicazione al Congresso dell'Associazione Francese per il Progresso delle Scienze. Tunisi, Maggio, 1951. [**Uninjured wheat seed. Communication to the Congress of the French Association for the Advancement of Science. Tunis, May, 1951.**] 1951, pp. 8., bibl. 8. [Ist. Allev. veg. Cerealicolt., Bologna, Italy]

An account is given of the studies by V. Peglion and E. Solieri on wheat seed having small injuries in the zone of the embryo caused by mechanical threshing. It is through these injuries that the various preparations employed for disinfecting wheat seed harm the embryo which thus loses its viability. It was proved that 150 kg./ha. of uninjured wheat seed are equivalent to 200 to 250 kg. of average injured seed. It is possible to reduce considerably these injuries caused by threshing machines. A first centre for producing uninjured wheat seed has been formed in Italy. [See also *Fld Crop Abstr.* 3 : 103.]—E.B.O.

703 DARPOUX, H. and others. Essais de lutte contre la carie du blé par des substances antibiotiques. [**Control of bunt of wheat by antibiotics.**] *C. R. Acad. Agric. Fr.* 1951, **37**, 511-12, bibl. 2. [Sta. Cent. Pathol. vég., I.N.R.A.]

Wheat seeds, var. Renfort, were infected with spores of *Tilletia tritici*. They were divided into lots and each lot was soaked for 4 hr. in the culture liquid of one of several fungi known to be antibiotics. Each lot was then sown in a metre-square plot and examined after 19 days. Of the antibiotics tested the most active were, in this order: *Penicillium claviforme*, *Aspergillus niger* no. 1104, *A. niger* no. 1102, *Penicillium* sp. no. 1005, and *Trichothecium roseum* no. 1050.—D.B.

704 MACHACEK, J. E. **Results from co-operative seed treatment experiments on small grains.** *Plant Dis. Rep.* 1951, **35**, 146-8. [Bot. and Plant Pathol. Div., Sci. Serv., Dept Agric., Ottawa]

The results are given of tests of 40 seed treatments carried out in 59 uniform trials. The seed-treatment chemicals included the following: Aagrano, Agrox C, Ceresan M, Half-ounce Leytosan, Mercuran, Mergamma C and Panogen. Summarized data are given of the effectiveness of these fungicides against smut on wheat, oats and barley and seedling blight of wheat and flax.—P.J.B.

705 PFEIFFER, R. Untersuchungen zum Weizenhalmfliegenproblem in den Alpenländern Österreichs. [**Investigation of the wheat-stalk fly problem in the Austrian alps.**] *Veröff. Bundesanst. alp. Landw. Admont* 1951, 66-95, bibl. 7, illus. [Bundesanst. alp. Landw., Admont, Austria]

An effective way of controlling the loss caused by *Chlorops taeniopus* would be the breeding of an extremely early ripening and stiff-strawed variety of winter wheat suited to the alpine climate. Early sowing is a further measure to be adopted.—D.B.

706 PAVLOV, I. F. [**Susceptibility of perennial grasses to injury by stem pests.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 12, 38-42. [Dokučaev. Inst. Agric. Black Earth Zone]

Perennial grasses are more severely attacked by the larvae of the Swedish fly (*Oscinella frit*) in the latter part of the summer than in the spring. The grasses in seeds mixtures in which the leguminous component constitutes more than 35% of the plants, are less heavily attacked than when the grasses are grown in pure stands. August-sown plots are less severely attacked by this pest than those sown in July. The race of Swedish fly which attacks perennial grasses also causes injury to spring wheat and barley.—R.P.J.

707 LE PELLEY, R. **Observations on the chafer grub—a serious pest of wheat, maize, flax**

and other crops in Kenya. *E. Afr. agric. J.* 1951, **17**, 69-79, bibl. 3, fig. 6, tbl. 4. [Dept Agric., Kenya]

The article deals with the species of the Melolonthid genus *Schizonycha*, the larvae of which are a severe pest of maize, wheat, flax and other crops in the Kenya highlands. Details are given of the effect of different chafer grub populations on crops. Field and small-plot observations show that severe damage is likely in flax at over 20 grubs to the sq. yd., in rye at over 40 and in maize at over 60. Experiments have shown that applications to infested soil of Agrocide 7 (at the rate of 2 lb. gamma BHC per acre) reduced the grub population. It was not evident that adequate reduction of the grub population could be achieved economically on a field scale by the application of BHC, though other preparations containing higher quantities of the gamma isomer may prove effective. Further observations are required on the relationship between soil conditions and chafer grub populations. It is thought that the latter tend to be higher the more acid the soil.—K.L.

708 LINDGREN, D. L. and VINCENT, L. E. **Relative toxicity of fumigants to *Tribolium confusum* and *Sitophilus granarius* in wheat.** *J. econ. Entomol.* 1951, **44**, 975-9, bibl. 5. [California Univ. Citrus Expt Sta., Riverside]

Sixteen compounds were tested for their effectiveness against the confused flour beetle (*T. confusum*) and the granary weevil (*S. granarius*) on the surface and at depths of 2 in. and 5.5. in. in 30 lb. samples of wheat. Methyl bromide appeared to be the most effective fumigant against *T. confusum* and *S. granarius* at all depths tested, with acrylonitrile a close second to methyl bromide against *S. granarius*.—From authors' summary.

709 ABOLINA, G. I. [**Concerning the stage of vernalization of branched wheat.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 11, 11-19. [Karagandinsk Agric. Expt Sta.]

The most suitable term of vernalization for seeds of branched wheats, ensuring good growth and development of the plants, was 7 to 10 days for the variety Kahetinskaja and 10 to 15 days for Bes-basbidaĭ. Vernalization of the seeds in a solution of phosphoric acid salts accelerated growth and development of the plants. Vernalization at temperatures of 2° to 4°C. caused no marked acceleration in development of the plants, but with vernalization temperatures of 6° to 8° and 10° to 12°C. development proceeded more rapidly. Energy of growth and development was greater in Bes-basbidaĭ than in Kahetinskaja.—R.P.J.

710 OVČINNIKOV, N. N. [**The effect on hybridization of the place of formation of the pollen in the ear of wheat.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 1, 76-7. [Kishinev Sta. Univ.]

The experimental material comprised the spring wheat varieties OD 13, Aljbidum 43, Melanopus 37 and Kandikans 76/10. Tabulated data show the percentage of seed set following pollination with pollen formed in different parts of the ear, i.e., the upper, middle and lower parts. The highest percentage of seed and the largest and heaviest seeds were obtained when the pollen was taken from the middle part of the ear.—R.P.J.

711 KARAPETJAN, V. J. [**Obtaining soft wheats from hard wheats experimentally.**] [Russian] *Trudy Inst. Genet.* 1950, No. 17, 32-95, bibl. 39. [Received 1951]

Pure lines of hard spring wheats (*Triticum durum*) were changed to soft wheats (*T. vulgare*) by sowing the hard spring wheats in autumn for several years in succession. It is claimed that the results prove that a change in external conditions effects changes in growth and development of the plants and their seed, these changes being ultimately reflected in biological and morphological characteristics of subsequent generations.—M.H.

712 VOLKOV, I. A. [**Root system and above-ground part of spring wheat under irrigation in the Kursk province.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **80**, No. 5, 829-32, bibl. 10.

The author studied the structure and growth of the root system of spring wheat (Lutescens 62) and of the wheat × *Agropyron* hybrid No. 22850 in different soil depths with the object of ascertaining norms and dates for irrigation. Results of the 1950 experiments are tabulated; they supplement the 1949 work recorded in *Fld Crop Abstr.* 4: 960. The data from the 1950 trials, in which there were unirrigated controls and plants irrigated (rate 270m^3) firstly at tillering and secondly (rate 540 m.^{3}) at shooting, are given in 3 tables. The information includes: (1) area (in m.^{2}) of the general root surface and of absorbing root surface of plants at the stooling (tillering) stage and at the grain-filling to milk-ripe stage, in different soil depths; and (2) weight of the above-ground parts of the plants in relation to root weight at the above stages of plant growth. Under the conditions of these tests there was an indication that yield resulting from the actively absorbing roots of Lutescens 62 is greater than that from the roots of the hybrid 22850.—M.H.

713 SIEV, D. **On the growth cycle and developmental stages of wheat and sorghum.** *Palest. J. Bot.* R. Ser. 1951, **8**, No. 1, 27-31. [Agric. Expt Coun., Jewish Settlements in Jordan Valley]

During two seasons in which several varieties of wheat were grown under special conditions it was found that: (a) Vegetative development, of which tillering is characteristic in wheat, was always connected (under the conditions of the experiments) with a short day. When wheat was given a shortened day, it tillered, no matter whether it had reached the heading stage or not. (b) Heading was connected with a day longer than the one required for tillering. Heading of early varieties occurred with a shorter day than is known for wheat generally. The early varieties did not respond like true long-day plants. All the varieties headed, no matter whether the long days occurred before the sowing and the tillering season normal in Israel. Other environmental conditions had no great importance in connexion with heading, e.g.: all the varieties headed at widely different temperatures. (c) It is generally accepted that the developmental stages of annual plants follow each other in a certain predetermined succession, and one stage has to be completed before the next begins. The terminal stage is considered to be flower formation. Reporting on our observations in 1946-47 we had stated that this order was not verified for early varieties: "The plant as a whole, however, after reaching the terminal stage of flowering and maturing went through the previous stage of vegetative tillering again and again." In the observations of 1947-48 it was proved that a growth cycle with a return to the vegetative stage after flowering and ripening, can be artificially induced even in a late variety, such as Nursi wheat (and even in *Sorghum cernuum*). Also, in our observations of 1947-48, the vegetative growth was evidently the immediate result of the influence of external conditions, but not of the inherent order of successive stages. (d) The natural growing conditions in the field enable wheat to bear one yield only. In the case of the above observations, however, under which wheat received appropriate conditions, it always bore more than one yield and behaved like polycarpic plants bearing yields several years in succession.—From author's summary.

714 Maume, L. and Dulac, J. Controle biochimique de la nutrition du blé en divers milieux et sur diverses variétés. [**Biochemical records of the nutrition of wheat in different environments and in several varieties.**] *C. R. Acad. Agric. Fr.* 1951, **37**, 573-6.

Information on the N, P and K status of the leaf at time of flowering and the yield per hectare is tabulated for the same variety of wheat (Vilmorin 27) grown in different localities and for 5 different varieties of wheat grown in 2 localities. Time of flowering is regarded as a particularly important stage at which to make the test because the plant has then absorbed its maximum amount of N, P and K and from then on lives almost entirely on its reserves. The leaf was taken from a defined point on the stem.—D.B.

715 Okuncov, M. M. and Levcova, O. P. [**The influence of copper on the water regime and drought resistance of plants.**] [Russian] *Doklady Akad. Sci. SSSR* 1952, **82**, No. 4, 469-51, bibl. 9. [Tomsk Sta. Univ. im V. V. Kuĭbyšev]

Experiments conducted with the Garnet variety of spring wheat indicated that copper had a favourable effect on the synthesis of protein, and thereby improved the water regime and drought resistance of the plants. The method elaborated by Okuncov of making copper available to the seeds during the period of vernalization is effective in increasing the plants' resistance to drought.—R.P.J.

716 Brown, J. C. and Harmer, P. M. **The influence of copper compounds on the yield, growth pattern, and composition of spring wheat and corn [maize] grown on organic soil.** *Proc. Amer. Soc. Soil Sci.* 1950, **15**, 284-91, bibl. 17. [Michigan Agric. Expt Sta., East Lansing]

In greenhouse studies, wheat and maize were grown in copper-deficient organic soil containing 86% organic matter. This soil was treated with 3000 lb. per ac. of 3-9-18 (NPK) fertilizer together with mineral supplements of Fe, Co, Mn, Zn, B and, where used, 200 lb. per ac. of CuSo$_4$. Cu-deficiency symptoms were not, or were only slightly, apparent in wheat where the soil was not given the manurial application. Where the manurial treatment was given, Cu-deficiency symptoms were marked. The omission of Cu from the manurial treatment resulted in high concentrations of N, P and K, and a lesser accumulation of Ca, Mg, Si and Fe in the plants, indicating their inability to utilize these elements in the absence of Cu. Cu-deficient plants also had low contents of Cu, reducing sugars and chlorophyll. Although Cu-deficiency almost completely prevented the growth of wheat plants, maize plants, though stunted and chlorotic, matured. Cu-deficient plants grown from the seed produced by plants with sufficient Cu recovered to some extent from their Cu-deficiency symptoms and produced seed. Plants grown from the seed of Cu-deficient plants remained stunted and failed to produce seed. Since maize has a large seed, the seed of maize plants grown on soil furnished with adequate amounts of Cu will contain sufficient Cu to enable plants grown from such seed, when sown on Cu-deficient soil, to produce grain yields approaching the normal. The seed of plants grown on Cu-deficient soil will not contain sufficient Cu to permit of normal plant growth when once more sown on Cu-deficient soil.—P.J.B.

717 Rigi Luperti, A. Concimazione al grano secondo un nuovo criterio. [**A new method of manuring wheat.**] *G. Agric. Domen.* 1951, **61**, 391.

A field trial was carried out in 1950-51 in Ascoli Piceno province, Italy, to test the effect on wheat yield of 3 different methods of applying the fertilizer. In each case, the wheat variety Faleria was sown at the rate of 2 q./ha., biammonium phosphate being applied at sowing at the rate of 2 q./ha. and calcium nitrate as a top-dressing at the rate of 60 kg./ha. In the first method the phosphate fertilizer was broadcast, in the second it was localized at a constant depth in the soil by applying it with the seed-drill, while in the third case it was localized at two depths, i.e., one-third at 3 to 4 cm. and two-thirds at 12 to 15 cm. deep. The grain yields from the 3 methods were, respectively: 26.5, 29.7 and 36.1 q./ha.—E.B.O.

718 Baldoni, R. Localizzare il concime? [**Should the fertilizer be localized**?] *Ital. agric.* 1951, **88**, 683-9, bibl. 10. [Ist. Agron. Univ. Bologna, Italy]

Three trials were carried out during 1946-51 to study the effect of applying fertilizers close to the wheat seed. The first 2 trials, conducted at Corticella on very fertile soil, confirmed that the application of fertilizers on this type of soil does not appreciably affect wheat yields, irrespective of the way they are applied. In the third trial, conducted on less fertile soil in the Ancona province with the wheat variety Libero, sown on 3 November in replicated plots of about 40 sq. m. each, the following treatments were compared: (a) control, not manured; (b) biammonium phosphate broadcast at sowing at the rate of 1.4 q./ha. and nitrate broadcast as a top-dressing at the rate of 2 q./ha.; (c) the same as in (b) with the difference that the phosphate was applied near the seed using a combine seed-drill; and (d) the same as in (c) with the difference that the nitrate, given as a top-dressing, was localized in the interlines. The grain yields from the 4 treatments were, respectively: 21,1, 26.2, 29.5 and 29.5 q./ha. A greater amount of thinning during winter and generally poorer growth were observed in the control plots and in the plots where the fertilizers had been broadcast than in the plots where the fertilizers had been applied near the seed.—E.B.O.

719 Salmon, S. C. **Analysis of variance and long-time variety tests of wheat.** *Agron. J.* 1951, **43**, 562-70, bibl. 10. [Plant Industry Bur., U.S. Dept Agric.]

The studies reported concern varietal trials with wheat in the Great Plains, to determine the importance of year × variety interactions, to point out some of the more important sources of experimental error and to review the interpretation of data from long-term trials.—P.J.B.

OAT

720 North Carolina Agricultural Experiment Station. Spec. Circ. 15. **Arlington oats in North Carolina.** By *G. K. Middleton* and others. 1951, pp. 6.

In tests in N. Carolina during 1947-50, Arlington outyielded all other varieties at each of 7 locations and also gave the highest hay yields. Arlington is the product of a (Lee-Victoria) × Fulwin cross. It is resistant to crown rust, including Race 45, to most races of smut and to mosaic, but is susceptible to *Helminthosporium* blight. Arlington is fairly stiff-strawed, tillers vigorously, is of medium-early maturity and has large, yellow awnless kernels of good test weight.—P.J.B.

721 Beliz, J. M. and Basto Folque, N. de. Novas formas cultivadas de aveia. [**New cultivated forms of oats (in Portugal).**] *Melhoramento* 1951, **4**, 67-73, bibl. 8, illus, pl. 7, French summary pp. 71-2, English summary p. 72.

Description, photographs, and a morphological key, are given for the following new Portuguese oat varieties: *A. byzantina*: Aveia de graça and Aveia de Santa Maria; *A. sativa*: Aveia de S. Francisco and Aveia de Santa Luiza.—N.G.S.

722 Nicholson, G. **Oat and barley varieties recommended for 1952 sowings.** *Agric. Gaz. N.S.W.* 1951, **62**, 621-4.

Brief notes are given on 19 oat and 5 barley varieties recommended by the Department of Agriculture for use as forage or for milling in the different districts of New South Wales.—K.L.

723 Šumilenko, E. P. [**Specialization of crown rust on oats.**] [Russian] *Bot. Z. SSSR* 1951, **36**, 635-42, bibl. 11. [All-Union Inst. Plant Protect., Leningrad]

The paper gives the results of a 3-year study, carried out in the Stavropol area, on the complete developmental cycle of *Puccinia coronata*. *Rhamnus pallasii* is an intermediate host of crown rust and, equally with *Rh. catharticus*, functions in the cycle by which oat sowings become infected. These intermediate host plants should therefore be rooted out. The uredospore stage of the fungus may develop on many wild grasses. The following species act as media for spreading crown rust in the uredospore stage: *Avena ludoviciana*, *A. fatua*, *Agropyron repens*, *Bromus inermis*, *Calamagrostis epigeios* and *Dactylis glomerata*.—M.H.

724 Bernhard, R. Caractères des lodicules d'avoine. Leur utilisation dans la déter-

mination des variétés. [**Characters of the lodicules of oats, their use in determining varieties.**] *Ann. Inst. nat. Rech. agron.* Sér. B. 1951, **1**, 355-66, illus. [Sta. Cent. Génét. Amélior. Plantes]

The lodicules of the oat, which were studied in a large number of varieties, have two characters which are useful in distinguishing between varieties otherwise indistinguishable. These are length and presence or absence of branching.—D.B.

725 KRESS, H. Erfolgreiche Jarowisation bei Hafer. [**Successful vernalization of oats.**] *Dtsch. Landw.* 1951, **2**, 510-11, illus. [Gulzow-Güstrow, Mecklenburg]

The development and yield of vernalized and non-vernalized oats sown at different dates in the spring of 1951 were studied. Tables show that when sown on 6 April the progress of development and the yields obtained were approximately the same whether the seed had been vernalized or not, but that when sown 14 days later (20 April) the vernalized seed developed more rapidly and produced higher yields of grain and straw than did the unvernalized seed. Sowing of vernalized seed is therefore recommended for land on which sowing has been delayed for various reasons.—D.B.

726 COFFMAN, F. A. and STEVENS, H. **Relation of temperature and time of day of pollination to seed set in oat crossing.** *Agron. J.* 1951, **43**, 498-9. [Plant Industry Bur., U.S. Dept Agric.]

At Aberdeen, Ohio, on hot days when maximum temperatures ranged from 91 to 95°F., oat flowers pollinated at between 2 and 5 p.m. set only 11.5% of seed, while for maximum day temperatures of 96 to 98°F., only 5.4% of seed was set. Pollinations carried out between 4 and 7.30 p.m. during days with these maximum temperature ranges set 19.7 and 24.8% of seed, respectively. These data indicate that crossing operations on days when maximum temperatures exceed 85°F. should be delayed until the evening.—P.J.B.

727 NOVIKOV, V. P. [**The effect of a deficiency of water in the soil at different stages of development in oats.**] [Russian] *Doklady Akad. Sci. SSSR* 1952, **82**, No. 4, 641-3, bibl. 14. [Leningrad Sta. Pedagog. Inst. im A. I. Hercen]

Results are reported of experiments with the northern moisture-loving variety Kyoto (*Avena ativa*) and the drought-resistant variety Byzantina I (*A. byzantina*). The resistance of the plants o an inadequate supply of water changes regularly during ontogeny, being least in the period from the ormation of the tetrad to flowering. This period is lso to be considered as " critical " in relation to a ack of water in the soil. While not denying the effect of an inadequate supply of water at this period in reducing the growth processes, shown by a decrease in yield, the author is of the opinion that the most important effect of an insufficiency of water is on the formation of pollen. Sterility of pollen is one of the chief factors which reduce the yield in the " critical period." During this period the ecological characteristics of the varieties are most clearly shown.—R.P.J.

728 MCCOY, T. A. and others. **Some effects of phosphorus on the development, the B vitamin content, and the inorganic composition of oats.** *Plant Physiol.* 1951, **26**, 784-9, bibl. 20. [The Samuel Roberts Noble Foundation, Ardmore, Oklahoma]

The investigation was designed to study the effect of high and low concentrations of phosphorus on the vitamin content of oats. Wintok oats no. CI.3424 were grown in sand culture with the amount of phosphate phosphorus varying from five times to one-tenth that of the control. Phosphorus-deficient plants matured earlier than others. There was a definite relationship between the amounts of phosphorus and nitrogen absorbed. Plants receiving five times the control amount of phosphorus contained more, and plants receiving one-tenth the amount of phosphorus contained less, folic acid, biotin, niacin, and calcium pantothenate in the plant tissue than the other plants receiving intermediate amounts of phosphorus. These all had practically the same vitamin content.—D.B.

RYE

729 GAYER, C. Instruçoes para a cultura do centeio. [**Instructions for the cultivation of rye (in Sao Paulo).**] *Colh. Mercados* 1951, **7**, Nos. 1-3, 23-4.

Rye is suitable for cultivation throughout the state of Sao Paulo. It should be sown between 15 March and 15 April, in lines 25-30 cm. apart, at a rate of 50-60 kg. per ha. In clay soils, the depth of sowing should be 2 cm., rising to 4 cm. in sandy soils. The average yield obtained in Sao Paulo is 1000 kg. per ha., but yields of 1800 kg. per ha. are not unusual. —N.G.S.

730 SCHILDT, R. and ÅKERBERG, E. Studier över tetraploid och diploid råg vid Ultunafilialen 1949. [**Studies of tetraploid and diploid rye at the Ultuna Branch Station of the Swedish Seed Association, 1949.**] *Sverig. Utsädesfören. Tidskr.* 1951, **61**, 254-68, bibl. 2, English summary pp. 267-8.

Studies were made of the number of fertile stalks, florets per ear and the percentage of florets with well developed kernels in diploid and tetraploid Steel rye. The number of fertile stalks was 6% lower in the tetraploid than in the diploid parent variety and the number of florets per ear, including rudimentary florets, averaged 10% lower in the tetraploid. Tetraploid Steel rye had 22.9% rudimentary florets, compared with 14.8% for the diploid parent, though these percentages appeared to be dependent to a considerable extent on environment, since the proportion of rudimentary florets in the tetraploid was considerably lower in small, isolated plots than in large-scale field trials. The tetraploid had a lower seed-setting percentage than the diploid, the difference ranging from 12 to 15%. This was partly due to differences in the number of florets per ear; for ears with the same number of florets, the difference was about 10%. There was a very close negative correlation between seed-setting and the number of rudimentary florets, both in the diploid and tetraploid rye. The sum of the percentages of rudimentary florets and seed-set was very constant, being 69% in the tetraploid and 77% in the diploid rye. This sum is considered to give the best measure of the fertility of a given variety. In the limited number of trials carried out, the grain yield of the tetraploid rye was 12% below that of the diploid. The 1000-grain-weight of the tetraploid was 44% higher, but the yield was reduced 7.2% by the lower number of fertile stalks, 10.7% as a result of the lower number of florets per ear and 17% through lower seed-set, as compared with the diploid. These results give some indication of the directions in which tetraploid rye can be improved by breeding.—P.J.B.

BARLEY

731 Nationaal Comité voor Brouwgerst. Meded. No. 16. Verslag van de zomergerst proefvelden in 1948 en 1949. [**Report of varietal trials with spring barley in 1948 and 1949.**] By *W. Wilten* and *A. T. Kortenhorst.* 1950, pp. 372-450.

The results are given of comparative trials on miniature plots and on hectare plots, both at 3 locations. The yields and agronomic character of the varieties tested on the miniature plots are given in full, together with a brief description of each variety. Few data are given from the hectare plots. The following new varieties were tested: Svalöf's Heimdal, Weibull's Rika, Weibull's Herta, Pajbjerg Drot, Pajbjerg 68/11 and 68/31, Carlsberg, Nordgaarden 56, the Dutch variety Agio C.B., the German Haïsa MR1 and the French varieties Aurore and Albert Busser. Kenia was used as a standard variety for comparison. Kenia is a consistently good malting barley under Dutch conditions, though it is being gradually superseded by Balder. Among the conclusions reached with regard to the different varieties after the 2-years' trials, were the following: Balder gave higher yields than Kenia and was satisfactory agronomically and with regard to malting quality. Aurore, which is related to Kenia, resembled that variety closely, though its diastatic power was greater. Herta gave high yields and was resistant to diseases. Its agronomic qualities were excellent, but its malting qualities poor. Rika gave high yields and was very similar to Herta. Haïsa MR1 gave higher yields and matured earlier than Kenia. Its malting quality was very good and it was completely resistant to mildew. Agio C.B. gave good yields and had excellent agronomic characters, but was of very poor malting quality. Carlsberg gave higher yields than Kenia and matured late. Its malting quality in 1948 was good, but in 1949 poor. Nordgaarden 56, Pajbjerg Drot No. 68/11 and 68/31 gave unsatisfactory results.—P.J.B.

732 Ulonska, E. Die Sommergerste in den bayerischen Landessortenversuchen, 1950. [**Summer barley in the Bavarian local varietal trials, 1950.**] *Z. Pflanzenb.PflSch.* 1951, **2,** 97-114. [Bayerische Landessaatzuchtanstalt, Weihenstephan]

The barley varieties under trial in 1950 were arranged in the following order of merit, beginning with the best: Breuns Franken III, Strengs Franken III, Firlbeck III, Heines Haisa, Ackermanns Donaria, Haarer Isdania Müllers Franken II, Schweigers Erika, Ackermanns Isaria. The conditions of the 21 trial areas as regards soil, weather and cultivation are tabulated.—D.B.

733 Latčenko, V. N. and Niščiĭ, I. A. [**Branched winter barley (*Hordeum vulgare*).**] [Russian] *Selek. Semenovod.* 1951, **18,** No. 11, 72-4. [Moldavian State Sel. Sta.]

Results of an experiment initiated in the autumn of 1949 to compare 10 varieties of winter barley of different provenance are reported. Owing to unfavourable overwintering conditions, most of the varieties perished. The variety Štamm 12 overwintered best, showing nearly 100% survival. During the earing of this variety, 42 plants of branched form were noted. In 1950, seeds of the branched plants were sown on soil of high fertility. In 1950/51, the branched forms overwintered well and made vigorous growth in the spring. The branched plants were almost equal to Štamm 12 in height and were 7 cm. taller than the spring barley variety Hanna Loosdorfskaja. The production of a branched form of barley having only two lateral branches makes it possible to increase the absolute weight of the grain and to obtain a grain yield two to three times larger than that of the ordinary non-branched forms.—R.P.J.

734 Aronovitch, I. and Kostrinsky, Y. **Results of barley variety trials.**[Hebrew with abridged English version] *Ktavim* (*Rec.*

Agric. Res. Sta.) 1950, **1**, 81-2 and 331-52. [Agric. Res. Sta., Rehovot, Israel] [Received 1951]

he experiments were initiated in 1939 and conluded in 1948. [The *Hordeum* species is not amed.] Varieties tested incuded B.M.C., F1, F48, 138, Gvati and Tunisian. On the basis of results btained, recommendations (summarized in a able) are made on the relative areas to be devoted ɔ each variety in several districts of Israel. The nost suitable sowing time is December, particularly or the early varieties (F1 and M38). January sowng reduces yields of all barley varieties, especially f the late types (B.M.C. and F 48).—From authors' nglish summary.

35 DERSCHEID, L. A. **Response of progeny of barley sprayed with 2,4-D.** *Agron. J.* 1951, **43**, 517-18, bibl. 6. [S. Dakota Agric. Expt Sta., Brookings]

rials with barley grown from seed taken from ars malformed by applications of the ester, amine nd sodium salts of 2,4-D showed that barley yields ere not affected by sowing seed from plants malrmed by 2,4-D.—P.J.B.

6 DOMMERGUES, P. Action de la colchicine sur l'orge cultivée. [**Action of colchicine on cultivated barley.**] *Ann. Inst. nat. Rech. agron.* Sér. B. 1951, **1**, 295-331, bibl. 22, illus. [Sta. Cent. Génét. Amélior. Plantes, Versailles]

s a result of studying the morphology, cytology nd germination behaviour of seeds of Aurore rley after treatment with colchicine, a method as been developed which gives a fairly regular rcentage of tetraploids. The method can be used r other varieties of barley and for other cereals. -D.B.

7 HILL, C. C. and others. **Barley varieties resistant to the hessian fly.** *Agron. J.* 1952, **44**, 4-5, bibl. 4. [Entomol. and Plant Quarant. Bur., U.S. Dept Agric.]

ials were carried out during 1945-50 in Maryland d Indiana with 5114 barleys, representing the ajority of the world collection assembled by the S. Department of Agriculture. Seven varieties re highly resistant at both localities to hessian (*Phytophaga destructor*). These were: Dinar, esert 13 and Besert 14 from Tunis, and Nile, rgarab, Abusir and Delta from Egypt. 14 varies of wild barley (*Hordeum spontaneum*) were sceptible.—P.J.B.

8 FILMER, R. S. and GINSBURG, J. M. **Effectiveness of airplane applications of insecticides and poison baits for control of armyworm and insecticide residue recovered at harvest.** *J. econ. Entomol.* 1951, **44**, 542-6, bibl. 6. [Agric. Expt Sta., New Brunswick, N.J.]

Observations were made on the effectiveness of controlling the armyworm, *Cirphis unipuncta*, in barley, rye, vetch and wheat crops with the following insecticides dusted by aeroplane or scattered by hand as poison baits: DDT, Parathion, Paris green and Toxaphene. Samples of straw and grain were collected at harvest and analyzed for insecticide residues. 4% Paris green and 5% Toxaphene poison bran molasses baits at the rate of 20 to 25 lb. per acre gave satisfactory control of armyworms in grain. Aeroplane applications of 1% Parathion, 3% DDT, 5% DDT, 10% DDT, 5% Toxaphene and 10% Toxaphene at the rate of 25 lb. per acre did not give satisfactory control. Barley dusted with DDT and Toxaphene, approximately 1 week before harvest, showed appreciable insecticide residues on the grain and straw at harvest. Barley, treated with poison bran baits 1 week prior to harvest, showed only slight residues at harvest. Wheat, dusted approximately 1 month before harvest and subjected to 3 to 7 in. of rain, had little residue at harvest.—From authors' summary.

739 DOMMERGUES, P. Représentation graphique de l'évolution morphologique d'une orge au cours de sa croissance. [**Graphic representation of the morphological evolution of barley in the course of its growth.**] *Ann. Inst. nat. Rech. agron.* Sér. B. 1951, **1**, 367-75, bibl. 9, illus. [Sta. Cent. Génét. Amélior. Plantes, Versailles]

Morphological stages in the growth of the barley plant which mark off definite periods in its life have been exactly defined. There are 7 stages: germination, appearance of first leaf, appearance of the points of the beard, appearance of the complete ear, the arching of the ear, yellowing of the stalk (disappearance of the last trace of green colour from the plant), and bending of the ear to an angle of 135° with its initial position (complete maturity). The material used for this study was Aurore barley, but the stages apply to other varieties of barley and to other cereals. These stages are the criteria for analysis of populations, for example the stage at which a parasite is apparent in a population, or the action of temperature on the production of a growth stage.—D.B.

740 KUMP, M. Nasljedivanje brojnosti koljenaca na klasnom vretenu ozimog golog i obuvenog ječma (*Hordeum distichum* Jess.) i prirod zrna. **Inheritance of the number of nodes on the ear in connection with hulled and naked kernel types of two-rowed winter barley.** *Poljoprivredna znanstvena smotra* (*Rev. Sci. Agric*) 1950, No. 12, 141-62, bibl. 17, English summary pp. 161-2. [Inst. Plant Breed., Univ. Zagreb, Jugoslavia] [Received 1951]

The author concludes that it is possible through hybridization of 2-rowed naked winter barley (having a low number of nodes on the ear) with 2-rowed hulled barley (having a high number of nodes) to produce a homozygotic recombination of 2-rowed naked winter barley with a high number of nodes, the type being more productive than the ordinary naked barley.—M.H.

741 KUMP, M. Nasljedivanje brojnosti provodnih snopića u vlati ozimoga golog i obuvenog ječma (*Hordeum distichum* Jess.) i otpornost prema polijeganju. **Inheritance of the vascular bundles in the stem of hulled naked two-rowed winter barley.** *Poljoprivredna znanstvena smotra* (*Rev. Sci. Agric.*) 1950, No. 12, 117-39, bibl. 18, English summary pp. 138-9. [Received 1951] [Inst. Plant Breed., Univ. Zagreb, Jugoslavia]

It has been observed that naked barleys of Jugoslavian origin have a smaller number of vascular bundles than the hulled varieties. The inheritance of this character has been studied and it is concluded that it is possible to produce a type of naked barley with a greater number of vascular bundles in the stem. The significance of the type in connexion with lodging resistance is mentioned.—M.H.

742 CLAVIER, Y. and CAUDERON, A. Un cas d'haploïdie chez l'orge cultivée. [**A case of haploidy in cultivated barley.**] *Ann. Inst. nat. Rech. agron.* Sér. B. 1951, **1**, 332-5, bibl. 5, illus. [Sta. Cent. Génét. Amélior. Plantes, Versailles]

A haploid plant occurred in a sowing of a six-rowed winter barley (var. Prefect). It was recognized at the time of earing by its reduced size. The flowers were sterile and the stamens, which remained indehiscent, contained irregular pollen. The morphological and cytological features of the plant are described.—D.B.

743 SKAZKIN, F. D. and FONTALINA, M. N. [**Reaction of barley (*Hordeum vulgare*) to an insufficiency of water in the soil during the light stage of development.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **81**, No. 2, 281-4, bibl. 15. [Hercen Leningrad State Pedagog. Inst.]

An insufficiency of water in the soil during the entire period of the light stage causes a reduction in the yield of barley plants because of a depressing effect on the ear of the main stem, as well as on the growth and development of the lateral stems. The reduction in the grain yield of the ear of the main stem at different periods of the light stage arises from different causes; in the first period, because of a reduction in the number of spikelets; in the second and third periods, mainly because of a disturbance in the course of differentiation of the florets. An insufficiency of water in the soil delays the growth processes in the barley varieties Medicum 26 and Viner, but in the more drought-resistant variety Medicum 26 development is on the whole accelerated while in the less drought-resistant variety Viner, development is generally retarded, which points to a different type of reaction of these varieties to an insufficiency of water in the soil.—R.P.J.

MAIZE

744 BUNTING, E. S. and BLACKMAN, G. E. **An assessment of the factors controlling the productivity of maize in England.** *J. agric. Sci.* 1951, **41**, 271-81, bibl. 9. [Dept Agric., Univ. Oxford]

An account is given of some 30 field experiments carried out in the South of England from 1942 to 1950, to assess the potential value for grain or forage production of 17 open-pollinated flint or dent maizes, together with 29 American or Canadian single or double hybrids. Early-maturing flint varieties consistently ripened their grain, but before being threshed or stored the cobs required drying. Sibthorp, a mass selection made from an unknown German variety, was the earliest and most productive flint maize and in the experiments yielded as much as 39 cwt. of grain per ac., with an average of 24 cwt. The earliest American hybrids, i.e. those with a USA rating of 80 days from sowing to maturity, gave very high yields of grain in favourable seasons. Spacing experiments indicated that for optimum grain production a density of 6 plants per sq. yd. was required for both flint varieties and the earliest hybrids. The ratio of the 'ear' (that is, the cob, immature grain and enclosing leaf sheaths) to the total shoot weight at harvest varied greatly with the variety or hybrid. With White Horsetooth, the usual variety grown for fodder in England, no cobs were formed before the plants were killed by frost, while with the early hybrids, the ear may be half the weight of the whole shoot. The earliest variety, Sibthorp, from an early May sowing, took approximately 70 to 80 days to reach full anthesis, while '80-day' American hybrids were a week later. From sowing to full maturity the period for the early flint varieties [including Sibthorp], was from 140 to 160 days, thus compared with conditions in Minnesota the period was nearly twice as long. Because of the much slower rate of development and because of the humidity of English autumns, it is concluded that until the date of maturity can be advanced some 14 days, grain production on a field scale is not yet feasible. On the other hand, many of the American hybrids are well fitted for the production of silage. The greatest drawback to the introduction of [expensive] hybrid seed is the liability of both seed and seedlings to be attacked by rooks.—From authors' summary.

45 FENAROLI, L. Oltre 100 quintali di mais per ettaro! [**Over 100 quintals of maize per hectare.**] *Ital. agric.* 1952, **89**, 22-6. [Sta. sper. Maiscolt., Bergamo, Italy]

précis is given of rules for growing maize, includng a list of maize hybrids adapted to the different talian environments, and data of plant density nd manuring. By a proper technique it should be ossible to raise maize yields to over 100 q. of grain er ha. in many Italian regions.—E.B.O.

46 KOHNKE, H. and MILES, S. R. **Rates and patterns of seeding corn [maize] on high-fertility land.** *Agron. J.* 1951, **43**, 488-93, bibl. 4. [Purdue Univ. Agric. Expt Sta., Lafayette]

lant spacing trials with maize were carried out uring 1944-47 on fertile Floyd silty clay loam in ndiana. Sowing methods used were hilling, drilling nd uniform spacing, to give 7 different sowing tes, ranging from 3930 to 27,512 kernels per ac. he highest average grain yields followed sowing tes of 15,000 to 19,000 kernels per ac. Drilling esulted in yield increases of about 8 bu. per ac. ore than hilling, while uniformly spaced sowing esulted in yields of about 2 bu. per ac. less than rilling. Up to plant densities of 20,000 per ac., dging increased; for plant densities between 0,000 and 27,500 per ac., lodging decreased constently as plant densities increased. Lodging was nsiderably less marked in hilled, than in drilled uniformly spaced crops. Ear weight declined eadily as the sowing rate increased, hilled maize ving slightly lower ear weight than that of the illed, or uniformly spaced crops. Tillering deeased as plant stands increased, the rate of tillerg being lowest in hilled and highest in uniformly aced crops. Every additional increase of 3500 to 00 kernels in sowing rates delayed silking by one y, the delay being greatest in hilled crops. From ese results it is concluded that a compromise tween hilling and drilling should be used. Uniform acing had no advantages over drilling. The best mpromise can be achieved by drilling 2 kernels ery 18 or 20 in. in rows 40 in. apart, to give sowg rates of between 17,400 and 15,700 kernels r ac.—P.J.B.

7 KVAKAN, P. Utjecaj zaperaka na visinu i dozrelost priroda kukuruza. **On the influence of tillers in corn [maize] on yield and maturity.** *Poljoprivredna znanstvena smotra* (*Rev. Sci. Agric.*) 1950, No. 12, 35-50, bibl. 3, English summary pp. 49-50. [Received 1951] [Inst. Farm Crop Prod., Univ. Zagreb, Jugoslavia]

is is a report on the experiments which have been rried out in 1945, 1947 and 1948 at the Farm ops Department of the Agricultural Faculty in greb, Croatia. Some F_1 hybrids tillered very profusely under favourable growing conditions and were used in studies on the influence of tillers in corn on yield and maturity. The following results have been obtained: 1. When maize was grown in one-plant hills, spaced 0.6 — 0.7 m. apart in both directions, the removing of tillers resulted in lower yields than those from untreated plants. The higher yields of untreated plants contained, however, 2.7 — 5.8% more moisture at harvest time than the lower yields of treated plants. 2. In growing 2 or 3 plants per hill with the same spacing, the growth of tillers was more or less decreased, the resulting yields, however, were remarkably increased and reached the value of 246.7 and 277.8 grams of shelled air-dried maize for 2- and 3-plant hills as compared to 223.9 grams for a 1-plant hill in 1947. Similar results were obtained in 1948, i.e. 362.8 and 451.7 grams of shelled air-dried maize for 2- and 3-plant hills as compared to 343.3 grams for a 1-plant hill. The loss of moisture from harvest time up to shelling date in the yields of 1-, 2-, and 3-plant hills was 24.2, 21.3 and 19.5% respectively in 1947, and 22.7, 21.5 and 20.8% in 1948. Thus, by closer spacing, higher and more mature yields from a definite area may be secured.—From author's summary.

748 NETHERLANDS. Directie van de Landbouw. Vlgschr. No. 7. De verbouw van mais. [**The cultivation of maize.**] By *W. R. Becker*. 1951, pp. 3.

Brief practical recommendations are given for maize cultivation in the Netherlands. Among varieties recommended are: Baanbreker, Unicum, Vroege gele ronde C.B., Goudster, Amtwee, Canbred 150, Amo and Wisconsin 240, in order of maturity, Baanbreker being the earliest. The first 3 are open-pollinated varieties and are not suitable for machine harvesting. The remainder are hybrids. The last 3 varieties are unsuited for the north and north-western regions owing to lateness of maturity.—P.J.B.

749 NETHERLANDS. Wageningen, Institute for Research on Crop Varieties. Maïs, 1951. [**Maize, 1951.**] *Bericht over Rassenkeuze* No. 93, 1951, pp. 4.

Data are given of the yields, in most cases during 1950, in different regions of the Netherlands, of the following open-pollinated maize varieties, Vroege gele ronde C.B., Baanbreker, Unicum and Raymakers 777; and of the following hybrid varieties, Amo, Wisconsin 240, Canbred 150, Goudster, Amtwee, Ameen, Nodak 301, Amdrie, K.E.3, K.F.1 and Wisconsin 255. The hybrid varieties quoted after Wisconsin 240, are given in order of earliness. In all cases the open-pollinated varieties were earlier than the hybrids. A short description is given of each variety.—P.J.B.

750 LAUBSCHER, F. X. **Hybrid maize in production.** *Fmg S. Afr.* 1952, **27**, 15-18. [Stellenbosch-Elsenburg Agric. Coll., Stellenbosch]

An account is given of preliminary trials (begun in 1946) to compare the yields of different hybrid varieties of maize with those of ordinary varieties growing in various districts of South Africa. Results so far indicate that certain hybrid combinations have considerable possibilities for increasing yields, depending on the adaptability of the hybrids to various conditions. The economic aspects of hybrid maize production in South Africa are discussed.—K.L.

751 LANZA, F. Prove orientative con mais ibridi americani e varietà italiane. Fattori di fertilizzazione e produttività. [**Preliminary trials with American maize hybrids and Italian varieties. Factors of fertilization and productivity.**] Suppl. *Ann. Sper. agr.* 1951, **5**, 1-11, bibl. 1, English summary pp. 10-11. [Sta. Chim.-agr. sper., Roma]

The object of these trials was to compare the grain yield of 5 American maize hybrids, U.32, U.41, U.50, Funk G.37, and Ohio M.15 with that of 3 Italian free-pollinated varieties, Macario, Merlino and Ciociaretto. The hybrids and the varieties were all grown at the rate of 4.32 plants per sq.m., under different conditions of soil moisture and manuring. The American hybrids yielded more than the Italian varieties when grown under conditions of high fertility, but yielded less when grown at low levels of soil moisture and fertility. Of the hybrids, Ohio M.15 appeared to be the most adapted to drought and low fertility conditions. The 5 hybrids were very susceptible to smut, *Ustilago maydis*, and to failure of fertilization in the ear tip.—E.B.O.

752 JOSEPHSON, L. M. **Injury to seed corn [maize] from vapors of TCA.** *Agron. J.* 1951, **43**, 513-14. [Kentucky Agric. Expt Sta., Lexington]

A note is given on seedling injury to maize caused by TCA vapour adsorbed on the seed coat.—P.J.B.

753 CONNECTICUT Agricultural Experiment Station. Bull. 532. **Hybrid field corn [maize].** By *D. F. Jones* and *H. L. Everett.* 1949, pp. 39, bibl.16. [Received 1951]

An account is given of tests of inbred strains, also a description of the inbred strains used in producing Connecticut hybrids. A note is given on the possibilities of producing commercial hybrid seed maize without detasseling, by using strains with sterile pollen.—P.J.B.

754 POLFEROV, B. V. [**Effect of quality of seed maize on yield.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 5, 60-2. [Kharkov Agric. Inst.]

To obtain large yields it is necessary to sow seed in which both energy of germination and germination are high. In experiments with maize, as with oats, a decrease in field germination was noted compared with laboratory germination figures. In an experiment in 1949, 3 seed lots of the maize variety Kharkov 23 with laboratory germination percentages of 100, 85 and 52, respectively, were sown on 9 May in a furrow 10 cm. deep, the seeds being placed 5 cm. apart. After calculating field germination, thinning was carried out, and the plants left in the row at 35 cm. apart. The seed with 100% laboratory germination gave a grain yield of 50.4 ctr/ha., that with 85% germination yielded 44.9 ctr/ha., and seed with 52% germination 33.9 ctr/ha. An experiment in 1950 with seed lots of the maize variety Kharkov belaja zubovidnaja (white dent) with laboratory germination percentages of 98, 96, 92, 86, 80 and 49, respectively, gave similar results. Seed with laboratory germination of 100% gave a grain yield of 42.2 ctr./ha. in 1950, while the grain yield from seed with 49% germination was only 15.4 ctr/ha. If seed with low germination is used, it is impossible to obtain a normal yield by increasing the seed rate.—R.P.J.

755 HOPPE, P. E. **A glass-tumbler-paper-doll technique for seed corn [maize] incubation and germination tests.** *Phytopathology* 1951, **41**, 856-8. [Wisconsin Agric. Expt Sta., Madison]

[See Abs. 757.] After cold treatment in a refrigerator, the maize seed is placed on moist paper towels which are then rolled up and placed in covered metal pans at room temperature. The method is described as simple, rapid and reliable and should be of value for the rapid evaluation of fungicides.—P.J.B.

756 RICHARDSON, C. H. **Effects of insecticidal fumigants on the germination of seed corn.** *J. econ. Entomol.* 1951, **44**, 604-8, bibl. 2. [Iowa Agric. Expt Sta., Ames]

Hybrid seed maize, produced in 2 different crop years, was fumigated for 7 days at 86°F. with 14 fumigants. The seed was then tested for percentage of germination within 1 month of fumigation, again after 1.5 to 2 years of storage. The germination tests included : the cold test ; cold test after treating the fumigated seed with the fungicide tetramethylthiuram disulphide ; a modification of the official warm test. The results of these tests placed the fumigants in 3 groups ; (a) fumigants highly detrimental to germination ; (b) a marginal group containing carbon disulphide only ; and (c) a relatively safe group including propylene dichloride trichloroethylene, a carbon disulphide-carbon tetrachloride mixture (20-80), carbon tetrachloride ethylene dichloride, and an ethylene dichloride carbon tetrachloride mixture (75-25). The safe fumigants can be used at doses up to about 10 ga per 1000 bu. of seed ; however, exposure time and removal of residual fumigant vapour after treatment are important in protecting seed viability. For the carbon disulphide mixture, carbon tetrachloride, and the ethylene dichloride mixture, at a dose of 6 gal. per 1000 bu., an exposure of 3 to 5 days and aeration of the seed after fumigation are suggested. Limited tests indicated that mixtures containing 5% ethylene dibromide are safe to use up to about 6 gal. per 1000 bu. Age of seed maize before fumigation is probably of less importance for seed viability than age after fumigation.—From author's summary.

757 HOPPE, P. E. **A new technique for incubating seed corn [maize] in cold soil for disease tests.** *Phytopathology* 1951, **41**, 747-51, bibl. 3. [Wisconsin Agric. Expt Sta., Madison]

The kernels are mixed with wet soil in a glass tumbler and incubated in an ordinary electric refrigerator at the desired low temperature. After incubation, the kernels are sown in pots in a greenhouse, the required data on the evaluation of fungicidal seed treatments being recorded when the seedlings reach the 3- to 4-leaf stage.—P.J.B.

758 RILEY, E. A. **Hybrid maize disease-resistance tests. Progress Report 1950/51.** *Rhod. agric J.* 1951, **48**, 428, bibl. 1.

See *Fld Crop Abstr.* 3 : 1290. The results of the investigations indicated that : (1) the separation of *Fusaria* into 3 species normally parasitic on maize and the inoculation of maize with these species separately, showed that their pathogenicity differed considerably. Different maize strains showed widely different reactions to *Fusarium* sp., some strains exhibiting marked resistance. (2) No maize strain was resistant to *Diplodia zea*, though the incidence of this disease in the field was low compared with *Fusaria* spp. (3) The maize strains showing resistance to the greatest number of pathogens were usually the best in yield, strength of straw and drought resistance.—K.L.

759 HAWKINS, J. **Importance of time of application of DDT sprays in control of European corn borer.** *J. econ. Entomol.* 1951, **44**, 569-71, bibl. 3. [Maine Agric. Expt Sta., Orono]

From trials carried out since 1946 it appears that insecticidal treatment for control of the European corn borer, *Pyrausta nubilalis*, is probably not necessary, under central Maine conditions, for maize in those growth stages before the late whorl. The best results with a single application of DDT sprays, giving 80 to 85% control, were obtained when the maize crops were treated in the stages from the late whorl to the late-green tassel, when the moth emergence had reached more than 87%. A less satisfactory control was obtained if the spray was applied when 71% of the moths had emerged.—E.B.O.

760 DITMAN, L. P. and LLOYD, G. W. **Timing treatments for European corn borer control.** *J. econ. Entomol.* 1951, **44**, 564-6, bibl. 6. [College Park, Maryland]

Trials were carried out in Maryland, in 1949 and 1950, to determine the best time for treating maize crops with a single insecticidal spray for the control of the European corn borer, *Pyrausta nubilalis*, in relation to stage of maize development. There were 3 series of experimental plots sown with sweet maize : (1) Marcross sown on 27 April, 1949 and 10 May, 1950 ; (2) Golden Cross Bantam, sown on 10 June, 1949 and 19 June, 1950, and Evergreen sown on 9 July, 1949. The 1950 late sowing did not ripen. Each of the plots of the series was sprayed once only, at intervals during different stages of maize development, with 2 lb. 50% wettable DDT powder per 100 gal. water applied at the rate of 200 gal. per acre. In each series of plots the highest reduction of larvae in the ear was generally obtained when the maize plants were treated in the early silk stage. There was no apparent relationship between the most effective time of treatment and the time of the heaviest egg deposition.—E.B.O.

761 PATCH, L. H. and others. **Stalk breakage of dent corn infested with the August generation of the European corn borer.** *J. econ. Entomol.* 1951, **44**, 534-9, bibl. 4. [Purdue Univ. Agric. Expt Sta.]

The amount of stalk breakage, the number of borers in the ear shanks and the reduction in grain yield, caused by the August generation of the European corn borer, *Pyrausta nubilalis*, were studied in 1944 in a field of dent maize hybrids infested artificially. 'An average increase of 10.1 borers per plant in 16 hybrids caused : an increase of 15.3% in the number of plants that broke below the ear, mostly owing to an increase of 2.8 borers per plant within the stalks below the ear ; an increase of 38.9% in the number of plants that broke above the ear, mostly owing to an increase of about the same number of borers within the stalks above the ear ; and a decrease of 18.9% of the total estimated yield of those plants, the decrease being 1.87% per borer per plant, including dropped ears and ears on broken stalks that touched the ground and were considered as not harvestable by a mechanical picker.' The loss in yield as the result of the general reduction in size of the ears was 10 times as much as the loss in yield due to unharvestable ears. The hybrids differed in the amount of breakage caused by borers.—From authors' summary.

762 KANSAS Agricultural Experiment Station. Bull 339. **South-western corn borer in**

Kansas. By *D. A. Wilbur* and others. 1950, pp. 46, bibl. 19.

The south-western corn borer (*Diatraea grandiosella*) has spread extensively in Kansas since 1941, though the sharp decline in maize acreages on certain sandy-soil areas since 1945 has caused a marked reduction in *D. grandiosella* populations in those regions. This bulletin reviews in detail all aspects of the effect of this pest on the maize crop and gives information on the injury caused to plants. Control measures include early sowing, cultivation practices, the sowing of borer-resistant maize strains and the substitution of sorghum for maize.—P.J.B.

763 RUTSCHKY, C. W. **Corn earworm control experiments in Pennsylvania in 1950.** *J. econ. Entomol.* 1951, **44**, 567-9. [Pennsylvania State Coll.]

Seven insecticidal preparations were tested for the control of corn earworm, *Heliothis armigera*, on sweet maize var. Iroquois grown in 3 series of plots, which ripened at different times in the season, in southeastern Pennsylvania. The tests were replicated 3 and 4 times with all preparations applied by hand equipment. The ears were examined at harvest. The emulsion sprays of a mineral oil and an insecticide were the best. Of these sprays, a 2% DDT emulsion in 7.5% mineral oil, which was applied twice at 4-day intervals beginning 8 days after the silks appeared, was the most satisfactory. —E.B.O.

764 GINSBURG, J. M. and FILMER, R. S. **DDT recovered on corn plants from different treatments against corn earworm.** *J. econ. Entomol.* 1951, **44**, 620. [New Jersey Agric. Expt Sta., Rutgers Univ., New Brunswick]

The following treatments for controlling corn earworm, *Heliothis armigera*, were compared on plots of seed maize: (a) dusting 3 times with 5% DDT powder at the rate of 6 lb. DDT per acre; (b) single spraying with DDT-oil emulsion at the rate of 2 lb. DDT per acre; and (c) injection of husk tips with DDT-oil at the rate of 0.2 lb. DDT per acre. Analyses for DDT residues showed that: (a) no DDT was present in the shelled kernels from any of the 3 treatments; (b) about 52 ppm of DDT were recovered from ear tips injected with DDT-oil, but none was found in ear tips from dusted or oil-emulsion sprayed plants; (c) relatively large amounts of DDT were present on the husks from each of the 3 treatments; (d) leaves and stalks from the DDT-oil emulsion sprayed plots contained several times as much DDT (51 ppm) as did the leaves and stalks from the dusted plots (6.5 ppm). —E.B.O.

765 CHAMBERLAIN, W. F. **Pre-silking sprays to control corn earworm and fall armyworm.** *J. econ. Entomol.* 1951, **44**, 590-2, bibl. 5. [South Carolina Agric. Expt Sta., Clemson]

Preliminary trials were conducted in Piedmont, South Carolina, during 1950, to test and adapt the Blanchard method for the control of the earworm, *Heliothis armigera*, and the fall armyworm, *Laphygma frugiperda*, on sweet maize sown during summer. The Blanchard method, consisting of an emulsion spray of oil and DDT, or some other chlorinated insecticide, applied 2 or 3 times at 2- or 3-day intervals starting about the 10% silk stage, is effective on spring-sown sweet maize but ineffective on summer-sown maize. These trials showed that, if 2 extra sprays are added before silking begins, the infestation by the 2 above-named pests can be reduced to less than 10%. All the spray materials employed caused some burning and a slight decrease in pollination in the maize plants. The sprays containing DDT were definitely superior to the other preparations tested.—E.B.O.

766 WATTS, J. G. and NETTLES, W. C. **Control of the sand wireworm with chlorinated insecticides.** *J. econ. Entomol.* 1951, **44**, 619-20. [South Carolina Agric. Expt Sta.]

Trials were carried out in South Carolina, in 1948, to determine the effect of Chlordane, BHC, Toxaphene and DDT, tested at 4 different rates, upon the sand wireworm, *Horistonotus uhlerii*. The insecticides were mixed with fertilizer and applied to the soil, immediately before sowing maize, in a field which had been heavily infested with sand wireworm in the past. Only moderate wireworm infestation developed in 1948. Tables show the yield response of maize to the various insecticide and fertilizer mixtures. Although in no case did the maize yield vary directly with an increase or decrease of a particular insecticide, probably because of lack of uniformity in infestation, the several rates of Chlordane were more consistent in increasing maize yield than any of the other insecticides tested. In 1949 and 1950 an increasing percentage of land under maize was treated with a Chlordane-fertilizer mixture at the rate of 1 lb. of toxicant per acre.—E.B.O.

767 GORTER, G. J. M. A. **Streak disease in maize. Helpful measures for its prevention.** *Fmg S. Afr.* 1951, **26**, 361-2 and 364. [Coll. Agric. Potchefstroom]

Streak virus disease of maize is spread by the leaf hopper *Cicadulina mbila* which feeds on wild grasses as well as on cereals. As no insecticide has yet been found for controlling the insect, control measures are based on excluding the insect from maize lands, viz: (a) by destroying all grasses (which may be carrying the insect) immediately before sowing the maize and (b) by planting maize at a distance from other cereal crops which may be acting as hosts to *Cicadulina*. Breeding is in progress to produce a high-yielding, streak-resistant maize but until such is available, reliance should be placed on the cultural methods for controlling the disease.—K.L.

768 COOPER, D. C. **Caryopsis development following matings between diploid and tetraploid strains of *Zea mays*.** *Amer. J. Bot.* 1951, **38**, 702-8, bibl. 10, illus. [Univ. Wisconsin, Madison]

The course of caryopsis development in crosses between diploid and tetraploid strains has been studied and compared with the development which follows pollination within each strain. During the first few days after fertilization, development is normal; thereafter there are marked abnormalities. In the 2n × 4n cross the abnormalities are chiefly abnormal meristematic activity of the endosperm and disintegration of the embryo; in the 4 n × 2 n cross the abnormality is failure of the embryo to store reserve nutrients. Only a small fraction of caryopses resulting from these crosses attain a germinable condition.—D.B.

769 ABBE, E. C. and PHINNEY, B. O. **The growth of the shoot apex in maize: external features.** *Amer. J. Bot.* 1951, **38**, 737-44, bibl. 5, illus.

ABBE, E. C., PHINNEY, B. O. and BAER, D. F. **The growth of the shoot apex in maize: internal features.** *Ibid.* 744-51, bibl. 13, illus. [Univ. Minnesota, Minneapolis 14 and Univ. California, Los Angeles 24]

This is a study of the relationships existing between plastochron, leaf initiation, and dimensions in the shoot apex of *Zea mays*.—D.B.

770 LENG, E. R. **Time-relationships in tassel development of inbred and hybrid corn [maize].** *Agron. J.* 1951, **43**, 445-9, bibl. 7. [Illinois Agric. Expt Sta., Urbana]

The development of the maize plant from the time of sowing to anthesis occurs in 2 phases. During the first phase, vegetative structures are differentiated and this phase ends with the elongation of the growing points and the beginning of differentiation of the tassel. During the second phase, the reproductive structures develop. The relative lengths of these two phases were studied in 8 inbred lines and 3 F_1 hybrids. With normal sowing dates, the time required from planting to tassel initiation was from 22 to 25 days for inbred R53, to 35 days for inbred L317. The time taken between tassel initiation and anthesis varied from 35 to 45 days. It was concluded that the length of each phase is probably controlled genetically. Heterosis accelerated both phases of development. A 30-day delay in sowing also significantly accelerated both phases, the acceleration being greater for the period between sowing and tasseling than between tassel initiation and anthesis.—From author's summary.

771 GARDEREN, J. van and others. **Radioactive phosphorus in a preliminary field study on phosphorus uptake by maize.** *S. Afr. J. Sci.* 1952, **48**, 226-31, bibl. 5.

This is a full account of the trials reported in Abs. 77.—K.L.

772 BURGER, O. J. and HAUGE, S. M. **Relation of manganese to the carotene and vitamin contents of growing crop plants.** *Soil Sci.* 1951, **72**, 303-13, bibl. 37. [Purdue Univ. Agric. Expt Sta., Lafayette, Ind.]

Studies were made to determine the effect of Mn on the carotene content of maize, wheat, oats and soyabeans, on the carotene-destroying system in these plants, and on the protein, choline and tocopherol content of soyabeans. Plants from untreated Mn-deficient control plots showed symptoms of necrosis and chlorosis and had low contents of carotene, carotene-destroying enzymes, protein and tocopherol, but high contents of choline. The soil application of 29.5 lb. per ac. of $MnSO_4$ increased the carotene content of maize leaves on 7 July, and 30 July, by 4 and 17%, respectively; on 1 June, 25 May and 13 July, applications of 5 lb. per ac. of $MnSO_4$ as a foliage spray increased the carotene content of the leaves of wheat, oat and soyabean plants by 31, 40 and 117%, respectively, compared with untreated controls. During the early period of growth, foliage applications of $MnSO_4$ stimulated the carotene-destroying system of soyabean leaves, the effect disappearing at late sampling dates. $MnSO_4$ applications increased the protein content of soyabean leaves during the early growth stages, this effect reversing itself after the onset of the reproductive phase; the choline content of both the stems and leaves of soyabeans was reduced by $MnSO_4$ treatment, while the tocopherol content of the leaves was significantly increased, compared with controls. There was no evidence that tocopherol, an antioxidant, inhibited the activity of the lipoxidase responsible for carotene destruction. Soyabean plants receiving a soil treatment of 150 lb. per ac. $MnSO_4$ had twice as many seed pods as the controls. A single foliage spray application of 5 lb. per ac. $MnSO_4$ appeared insufficient to carry the plants through the season. The results of these studies indicated that no additional stimulation of production of carotene or of the other constitutents noted could be obtained, once the initial Mn deficiencies had been corrected. —P.J.B.

773 TATUM, L. A. and CURME, J. H. **Some responses of young corn plants to maleic hydrazide.** *Plant Physiol.* 1951, **26**, 836-9,

bibl. 9, illus. [Kansas Agric. Expt Sta., Manhattan; and Div. Cereal Crops and Dis. Bur. Plant Industry, U.S. Dept Agric.]

The growth-retarding property of maleic hydrazide suggested the possibility of using this chemical in producing seed of hybrid maize where the parents used may differ in their time of flowering. A pronounced differential response was observed in the various strains of maize to the chemical and to different concentrations of it. The earlier-maturing strains showed the greater response. Besides retarding growth, maleic hydrazide caused the development of a red pigment in the leaves. During a dry period which followed the treatment, it was noticed that treated plants wilted sooner than untreated ones. On the basis of this preliminary test the treatment does not appear to offer much promise as a practical measure for controlling date of flowering in maize.—D.B.

774 STONE, P. C. and SMITH, G. E. **Preliminary insecticide-fertilizer soil treatments.** *J. econ. Entomol.* 1951, **44**, 810-11. [Missouri Agric. Expt Sta., Columbia]

Trials were carried out in which Chlordane, Aldrin, Dieldrin, Heptachlor and Lindane were each applied at a rate of 1 lb. per ac. mixed with 200 lb. per ac. of 3-12-12 (NPK) manure before sowing maize. Plots treated with Aldrin, Dieldrin and Heptachlor and manure gave grain yields of 100 to 103 bu. per ac. compared with 97 bu. per ac. for plots treated with manure, but without insecticide. The insecticide-fertilizer treatments greatly increased growth rates in the early part of the season, compared with plants receiving manurial treatment only, but did not result in significantly higher yields.—P.J.B.

775 CALMA, V. C. and CASTRO, D. L. **The effect of the time of applying ammonium sulphate on the yield of corn.** *Philipp. Agriculturist* 1950, **34**, 116-20, bibl. 3. [Philipp. Univ. Coll. Agric., Agron. Dept]

Ammonium sulphate, applied to flint maize var. Native Yellow at the rate of 100 kg. per ha. at sowing time, either in the dry or the wet season, did not affect the germination, flowering or the ripening dates. Except on badly drained soil, the maize plants of the fertilized plots were generally of a darker green colour and were more vigorous than the non-fertilized control plants. In dry season cultivation, ammonium sulphate applied at sowing increased the yield of stover and grain. It also had a beneficial effect upon yield when applied 3 weeks after sowing, but did not influence the yield of stover and grain when applied 6 weeks after sowing. In wet season cultivation, ammonium sulphate, applied at any time, did not affect significantly the yield of stover and grain.—E.B.O.

776 KRANTZ, B. A. and CHANDLER, W. V. **Lodging, leaf composition and yield of corn [maize] as influenced by heavy applications of nitrogen and potash.** *Agron. J.* 1951, **43**, 547-52, bibl. 12. [N. Carolina Agric. Expt Sta., Raleigh]

The trials were carried out on 6 soil types, with exchangeable K contents ranging from 0.1 to 0.39 m.e. On all K-deficient soils, 80 lb. per ac. of K_2O decreased lodging and increased grain yields, though on Bladen silt loam (0.1 m.e. exchangeable K), 120 lb. per ac. of K_2O were necessary to give comparable results. Additional increments of K_2O did not further effect lodging or yields. On soils not deficient in K, applications of K_2O had no effect on yield or lodging. N applications markedly raised grain yields, compared to no N treatment, and only slightly increased lodging. Increasing plant densities increased lodging and there were considerable differences between varieties in this respect. The K content of the maize leaves increased progressively as K_2O applications rose to 320 lb. per ac., though this was not reflected in the yield, lodging, or the composition of the grain. P uptake by the plants was closely related to the P content of the soil. N applications increased the N content of the grain and the leaves and also increased P and K uptake, particularly where the soil had a high content of these elements.—P.J.B.

777 SPRAGUE, G. F. and FEDERER, W. T. **A comparison of variance components in corn [maize] yield trials. II. Error, year × variety, location × variety and variety components.** *Agron. J.* 1951, **43**, 535-41, bibl. 4. [Iowa Agric. Expt Sta., Ames]

Studies were made of the optimum number of plot replicates, years and locations necessary to provide a safe guide for the interpretation of maize yields. The results suggested that the optimum distribution of a given number of plots would be one replication per location, with an increase in the number of locations and trial years, where cost is disregarded. Four solutions are given for obtaining the optimum number of replicates, trial years and locations for a given number of varieties, at given costs.—P.J.B.

778 THOMPSON, D. J. and HUTCHCROFT, C. D. **Accuracy of estimating the mean percentage of nondetasseled plants in double cross corn [maize] seed production fields.** *Agron. J.* 1951, **43**, 609-16, bibl. 5. [Iowa Agric. Expt Sta., Ames]

Field inspection records of the Iowa Crop Improvement Association, made during 1945-8 are summarized and examined. A sampling method using sequential principles is suggested as being suitable for sampling pollen shedding pistillate tassels in double-cross seed production fields. An operating characteristic curve and a proposed sampling plan are presented.—From authors'summary.

779 SHAW, R. H. and THOM, H. C. S. **On the phenology of field corn** [**maize**], **silking to maturity.** *Agron. J.* 1951, **43**, 541-6, bibl. 15. [Iowa Agric. Expt Sta., Ames]

Studies were made over a 4-year period of the maturity of early, medium-early and late-maturing hybrid maize in Iowa, to provide a method of forecasting the time of maturity of maize and thus estimate the likelihood of frost-damage and the proportion of soft grain in harvested crops. A number of methods were used to determine the time of maturity, as defined by the time at which the grain reaches its maximum weight. During the 4 years of the trials, though climatic conditions varied, the time taken from silking to maturity was very constant at 50, 51 and 52 days for the early, medium-early and late-maturing varieties, respectively, and this period could be used to forecast the time of maturity, where the time of silking was known. The moisture content of the grain of the varieties at maturity averaged 30, 37 and 42%, respectively, during the trial period, variations between years ranging from 6 to 10%. Ears harvested at under 50 days from the time of silking had not reached their maximum weight, irrespective of their stage of development. The content of water solubles in the grain was closely correlated with moisture content, but not with the time of maturity. [See also *Fld Crop Abstr.* 4 : 1006.] —P.J.B.

MILLET AND SORGHUM

780 DAVYDOVIČ, S. S. [**Foxtail millet** (***Setaria italica***) **at the North Osetian State Selection Station.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 11, 71-2. [North Osetian State Sel. Sta.]

Hulled grain of *S. italica* contains 17 to 19% crude protein (2.5 to 3.5% more than *Panicum miliaceum*) and up to 5.4% fat. It has a high content of vitamins B_2 and E. Results are reported of investigations conducted with *S. italica* at the Station in 1950/51, when *inter alia* the effect of different fertilizers on re-growth of the plant after cutting was studied. *S. italica* showed more vigorous re-growth after harvesting for seed than after cutting for hay. Possibly this property of the plant may be of some importance for the autumn grazing of cattle.—R.P.J.

781 COTTE, A. Sorghos à grain, sorghos sucrés et Sudan-grass. [**Grain sorghum, sugar sorghum and Sudan grass.**] *Ann. Inst. nat. Rech. agron.* Sér. B. 1951, **1**, 34-76, bibl. 65. [Ecole nat. Agric., Cent. Rech. Agron. Midi, Montpellier]

Trials were conducted at Montpellier in 1948 and 1949 to test sorghum as a drought-resistant substitute for maize in parts of southern France where that crop does not always give good results. Material was obtained from all parts of the world. The full account includes a study of the life cycle of sorghum as observed at Montpellier. Cyanogenetic glucocide content was also studied. Certain varieties were found to compare favourably with maize either as summer cereals or for green fodder, and a large quantity of seed of the grain sorghums Early Hegari (from Texas) and S 40 (from Morden, Manitoba, Canada) was reproduced for trial by farmers. Selection and seed production from 1950 onwards would take place in these 2 varieties, in the sugar sorghums (*S. vulgare* var. *saccharatum*) Rox Orange (from USA) and Sucré Drome (France), and in the Sudan grass (*S. vulgare* var. *sudanense*) variety Sweet Sudan (bred strain from Texas).—G.M.R.

782 JONES, M. D. and SIEGLINGER, J. B. **Effect of wind direction on natural crossing in sorghum, *Sorghum vulgare* Pers.** *Agron. J.* 1951, **43**, 571-2. [Oklahoma Agric. Expt Sta., Stillwater]

The results of trials in Oklahoma over a 2-year period indicated that though the prevailing winds were southerly, it was necessary to exercise isolation precautions against natural crossing between sorghum crops in all directions and not only in respect of the direction of the prevailing winds.—P.J.B.

783 COLEMAN, O. H. and BELCHER, B. A. **Some responses of sorgo to short photoperiods and variations in temperature.** *Agron. J.* 1952, **44**, 35-9.

Five sorgo (*Sorghum vulgare*) varieties of different adaptation, Waconia Amber, Leoti, Collier, Honey and Hodo were sown in greenhouses at 5 different dates in the autumn and winter at Canal Point, Florida. Under the conditions of an 11-hour daylength in winter, average daily temperatures of 75°F. during the period from sowing to flowering caused Waconia Amber, Leoti and Collier to develop as rapidly as they normally do in a 13.6-hour daylength. Honey and Hodo, which are adapted to conditions in south USA, produced flowers somewhat earlier than the other varieties under these conditions, even in relatively cool conditions. The thermal requirements of Collier were much more exacting than those of the other varieties. Under conditions of 11-hour daylengths, temperatures below 70°F. for 30 days after sowing delayed the time of first anthesis of Collier much more than that of Hodo, Honey, or Waconia Amber, which were very similar to one another in their reaction to temperature. These results indicated that the thermal requirement of a given sorghum variety must be met before it will respond to photoperiod and that varieties differ in their reaction to temperature.—P.J.B.

RICE

784 Bolhuis, G. G. Enige bijzonderheden over de rijstcultuur in zuid-Frankrijk. [**Some details of rice culture in southern France.**] *Landbouwk. Tijdschr.* 1951, **63**, 779-805, bibl. 7. [Lab. Trop. Landbouwplant., Wageningen]

A review is given of developments in rice cultivation in the Camargue region of the Rhône Delta, which produced 30% of the rice consumed in France in 1950.—P.J.B.

785 Terre Marocaine. La riziculture française. [**Rice cultivation in France.**] *Terre maroc.* 1951, **25**, 203-6.

This is an extract from an article published in *Bulletin des Engrais.*—E.B.O.

786 Ceylon. Botanist and Agricultural Research Divisions. **Results of recent research on paddy** [**in Ceylon**]. *Trop. Agriculturist* 1951, **107**, 110-11.

For transplanted paddy, the optimum spacing of hills is 6 in. by 6 in. for varieties of a sowing-to-harvest age not exceeding four months, and 7 in. by 7 in. for slower maturing varieties. The optimum seedling number is three per hill for varieties of a sowing-to-harvest age not exceeding four months, and two per hill for slower maturing varieties. With varieties of a sowing-to-harvest age not exceeding four months, seedling-age at transplanting should not exceed three weeks, and with slower maturing varieties, seedling age should not exceed 4-5 weeks. The application to the nursery of superphosphate at the rate of 1.5 cwt. per acre is recommended, which treatment has given significant yield increases of 4 to 47%. Yield increases can be obtained by pre-sowing treatments of seed paddy. For Vellai Ilankalayan the treatment consists in soaking the seed in water for 6 hours and keeping it tied, wet, in a gunny-bag for an additional 6 hours. Fertilizer trials in most areas indicate the existence of a nitrogen-phosphate interaction. Fertilizer response in yala is often more marked than in the maha season. [The maha is the crop of the N.E. monsoon season, and yala the crop of the S.W. monsoon season.]—N.G.S.

787 Chandraratna, M. F. **Rice in Java.** *Trop. Agriculturist* 1951, **107**, 103-9, bibl. 7.

There are three types of rice lands in Java: uplands, unirrigable lowlands and irrigable lowlands, the last constituting 70% of the rice acreage. Rice is often rotated with groundnuts, cassava and similar crops, even when irrigated. Two main types of varieties, termed bulu and tjereli, occur. Crosses between the two show a high degree of sterility in the F_1 generation. Of pure line varieties, Brondal 277, Baok, Benong 130, Djambu 129 and Gropak Gedeh 97 yield well, resist lodging and tiller freely. Outstanding are the 40-C selections resulting from the Tjina × Lati sail cross. The time to mature taken by the varieties grown varies from 130-240 days. In some parts of Java, two or three crops of rice a year are taken off the same land. Where two crops are grown, a 160-day variety is grown in the East monsoon period, followed by a 130-day variety. Rice is always transplanted when grown on irrigated fields in the lowlands. The seedbeds are sown with whole panicles at a rate of 400 lb. per acre. The beds are covered with water when the seedlings are established, and thereafter the water level is gradually raised to a maximum of 4 in. 165-day varieties are transplanted at 40-45 days old. Before transplanting, the fields are well ploughed and harrowed. Seedlings are transplanted in bunches of 3-4 per point, 8 in. apart and 2 in. deep. Harvesting is done by cutting the panicles one by one with a small knife. Upland rice responds to N but lowland rice does not. Response to K is good. *Sesbania aculeata*, sunnhemp, cowpea, *Canavalia ensiformis* and *Mucuna pruriens* have proved satisfactory green manures. The main diseases and pests of rice in Java are noted.—N.G.S.

788 Breaux, N. Cultivo del arroz en el Paraguay. [**Rice growing in Paraguay.**] pp. 29, Asunción, Paraguay, 1950. [Minist. Agric., Paraguay, and Serv. Téc. Interamer. Co-op. Agríc.]

Measures for improving rice-growing technique in Paraguay are proposed. (1) Tillage. Ploughing twice, with an interval of 3 months, instead of one, is recommended, also the use of tractors instead of oxen whenever possible and the greater use of machinery such as disk harrows, drill sowers, etc. (2) Irrigation. Approximately 1650 mm. of water are required to produce a crop of rice in Paraguay. During the growing season the crop is submerged for 60 to 90 days, the depth of water being increased gradually to 10 or 15 cm. More care should be taken in draining before harvest: this should be done some 2 weeks before, if machinery is used in harvesting. (3) Mechanical harvesting is preferable to the current method of scything, which takes so long that much of the grain becomes overripe. (4) Rotation is necessary to control the spread of coloured rice and to maintain fertility. The rotation recommended is 1 year rice and 2 years grazed herbage leys: trials of legumes and grasses for this purpose are in progress. (5) Choice of varieties. Trials have shown

Zenith, an early strain with medium-sized grain, which is resistant to *Piricularia oryzae*, to be suitable for Paraguayan conditions and superior to the Blue Rose variety from which it has been selected. It should as far as possible replace Blue Rose, which now occupies 40% of the rice area. (6) Diseases and pests. *Piricularia oryzae* causes the greatest damage. "Straight heads," a physiological disease which is less common, can be controlled by better irrigation technique. Insect pests are *Solubea pugnax*, *Diatraea saccharalis*, *Diabrotica duodecimpunctata*, and *Lissorhoptrus simplex*. Methods to control them are suggested.—G.M.R.

789 FERREIRA, J. E. and DUERST, E. A. Costo de producción del arroz en el Paraguay, cosecha 1948-49. [**Cost of production of rice in Paraguay, 1948-49 harvest.**] pp. 44, illus., Asunción, Paraguay, 1950. [Minist. Econ., Paraguay and Serv. Téc. Interamer. Co-op. Agríc.]

An economic study was made of 10 representative rice plantations of different size situated in the south-east of Paraguay. Some of the conclusions reached were that the cost of production per unit area is considerably lower on a large than on a small area, that the minimum economic size of a plantation is from 50 to 80 hectares, and that costs can be reduced through the improved cultural technique outlined in a separate publication by Breaux [see Abs. 788]. Valuable original photographs illustrate the present work.—G.M.R.

790 FRANCOLINI, J. de. La culture du riz aux Etats-Unis. [**Rice cultivation in the USA.**] *Terre maroc.* 1951, **25**, 179-81, bibl. 3.

791 PIACCO, R. Le razze di riso coltivate in Italia. [**The rice varieties grown in Italy.**] *Risicoltura* 1951, **39**, 13-21, 34-43 and 60-70, bibl. 1. [Sta. sper. Risicolt. e Colt. irrigue, Vercelli, Italy]

A 17-page list gives the rice varieties imported into Italy from many rice-growing countries of the world, during the last 20 years, with notes on their vegetative development in northern Italy. The possibility of acclimatizing foreign rice varieties in Italy is discussed. Information is given on the vegetative cycle of some Italian varieties grown in foreign countries. The behaviour of some Japanese rice varieties grown in Italy is compared with their behaviour in Japan. It is concluded that the varieties from Japan have greater probabilities of becoming acclimatized in Italy than the varieties from other countries, but these probabilities are greatly reduced when the Japanese varieties are from regions situated at a lower latitude than 45° N, which corresponds to the extreme north of Japan. The possibility of obtaining better results in Italy from foreign rice varieties than from the Italian varieties is small. Among the best Italian rice varieties are: Americano 1600, a common type, which yields 60 to 80 q./ha. throughout Italy, and up to 100 q./ha. in Bologna province; R. Bersani, a superior type, also high yielding; and Maratelli, early, which yields 55 to 65 q./ha. [See also *Fld Crop Abstr.* 3 : 448 and 4 : 74.]—E.B.O.

792 PIACCO, R. Le razze di riso coltivate in Italia. 3. Gli incroci artificiali. 4. Classificazione botanica dei risi coltivati in Italia. 5. Le razze di riso italiane. [**The rice varieties grown in Italy. 3. The artificial crosses. 4. Botanical classification of the rices grown in Italy. 5. The Italian rice varieties.**] *Risicoltura* 1951, **39**, 88-114, 133-67, 192-202 and 235-9, bibl. 5, illus. [Sta. sper. Risicolt. e Colt. irrigue, Vercelli, Italy]

[See previous abstract.] An account is given of the work carried out at the above Station, from 1925 onwards, to obtain new rice varieties, by crossing, from 42 Italian and 30 foreign varieties. The mode of inheritance of the main rice characters is described. The Italian rice varieties are classified according to the Gustchin-Piacco classification (the analytical key of which is given) integrated with the recent classification by R. Portères. The Italian rice varieties belong to *Oryza sativa*, subspecies *communis* Gustchin series *pilosa* Portères, and, all but one, belong to the proles *japonica*. The rice varieties now grown in Italy are described and their respective areas of cultivation in 1950 are shown. The principal varieties in decreasing order of area cultivated are: Americano 1600, Maratelli, R. Bersani, Arborio, Vialone Nero, Razza 77, Ardito, Sancio P.6, Pierrot, Ardizzone, Vialone Nano, Carnaroli, Sesia and Allorio. Americano 1600 is grown on 70% and Maratelli on 10% of the total rice area. Vialone Nero gives the best quality grain.—E.B.O.

793 CHIAPPELLI, R. Prove di orientamento delle nuove varietà di riso. [**Preliminary trials with new rice varieties.**] *Risicoltura* 1951, **39**, 174-8. [Sta. sper. Risicolt. e Colt. irrigue, Vercelli, Italy]

New selected rice varieties were tested in various regions of Italy in 1950. The requirements of Razza 316, 317 and 321, which have a larger and better quality grain than Chinese Originario, are similar to those of this variety. They are therefore suited to those regions of northern Italy where Americano 1600 and Chinese Originario are grown. Stirpe 82, 115, 140, 148 and 27, with translucent grain, obtained from Lady Wright, Chinese Ostiglia and Vialone Nero, are suited to the deep, well-manured soils of Bologna, Modena and Ferrara provinces and to the Polesine.—E.B.O.

794 Vianna e Silva, M. Uma nova forma cultivada de arroz. [**A new cultivated form of rice.**] *Agronomia Lusitana* 1951, **13**, 171-83, illus.

The hybrid rice E.A.N. No. 6, named Português, was bred in Portugal from a cross between Novara and Muga. A detailed description is given of Português, and also of the parent varieties. It has a vegetative cycle of 117 days, as compared with 173 days for Novara and 169 days for Muga. In 1948 and 1949 an average yield of 5644 kg. per ha. was obtained from Português at the Posto Experimental do Vale do Tejo, and of 7223 kg. per ha. at the Posto Experimental do Vale do Sado. No comparative figures are given of the other two varieties.—N.G.S.

795 Abichandani, C. T. and Ramiah, K. **Treatment of rice seed in nutrient solutions. as a means of increasing yield.** *Curr. Sci.* 1951, **20**, 270-1, bibl. 4. [Cent. Rice Res. Inst., Cuttack 4, Orissa, India]

Seed of the rice variety T.608 was treated with: (1) various nutrient solutions each at 3 levels, 2M, M, and M/2, and (2) with cow dung paste and (3) water soaking. Seed was soaked in one-third its weight of nutrient solution in a shaking machine for 24 hr. and the treated seeds then sun dried and stored in containers for 30-40 days before sowing. No adverse effect on germination was caused by storage. It was shown that treatments with K_2HPO_4 and K_3PO_4 gave yields significantly higher than the control, and that $(NH_4)_2 HPO_4$ at the M and 2M level depressed yields considerably. Other treatments tried had no significant effects. —N.G.S.

796 Peltier, M. Première contribution à l'étude de l'action des organo-mercuriques sur la germination et la division de la cellule chez le riz. [**First contribution to the study of the action of organo-mercury preparations on the germination and cell division of rice.**] *Agron. trop.* 1951, **6**, 651-2. [Agron. Sta. Alaotra, Madagascar]

Seeds of the rice varieties MKK 752, MKK 803 and MKK 823 were treated with 2 fungicidal preparations, Ceresan, containing 1.5% mercury in an organic combination of mercury silicate, and Panogen, containing 0.8% mercury in an alkylic combination. The lots of treated seeds and control seeds were germinated in Petri dishes. The lots treated with Panogen showed a delayed growth after the third day from germination, and an abnormal development from the fifth day. Ceresan, at the dose employed, appeared to stimulate slightly the growth of the seedlings. It is possible that at higher doses Ceresan might also influence growth unfavourably.—E.B.O.

797 Bassarakaja, M. A. [**Vernalization of rice.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 12, 50-6. [Odessa Agric. Inst. Dept Bot. and Plant Physiol.]

The duration of the vernalization stage varies in different varieties of rice. In the variety Zolotye ushody it should not exceed 7 days, and the best results with this variety are obtained at a temperature of about + 22°C. In the variety Arpa-Šaly the duration of vernalization is about 10 days and, in Kendzo, 15 days, at a temperature of from + 20° to +22°C.—R.P.J.

798 Dabin, B. Alimentation minérale du riz. Interprétation d'un essai d'engrais réalisé à l'Office du Niger. [**The mineral nutrition of rice. Interpretation of a manurial trial conducted by l'Office du Niger.**] *Agron. trop.* 1951, **6**, 507-13, illus.

A brief account is given of a rice manuring trial conducted at the Rice Station at Kayo, French Sudan, in 1949, with the variety Sikasso B. Tables show the manurial treatments applied and the corresponding yields of paddy and straw obtained. Results showed that: (a) ammonium sulphate was highly effective; (b) the small reserve of phosphoric acid in the soil was sufficient to mask the effect of applying a P fertilizer; (c) a P K fertilizer, applied alone, gave a significant increase in yield compared with the unmanured control, but, when applied in addition to ammonium sulphate, it gave only a slightly higher increase in the paddy yield. The foliar diagnosis method was adopted for determining the effect of the various fertilizers on the nutrition of rice at different stages of development. It is concluded that, with the exception of N, there are at present sufficient mineral elements in the soil to ensure high rice yields. However, it is considered advisable to return the rice straw to the soil and also to supply P and K fertilizers to maintain the present level of soil fertility.—E.B.O.

OTHER

799 Revista De La Bolsa De Cereales. Alpiste. Instrucciones para su cultivo. [**Instructions for the cultivation of *Phalaris canariensis* (in Argentina).**] *Rev. Bolsa Cereales* 1951, **38**, No. 2019, 16.

Ph. canariensis should be drilled in lines 20-35 cm. apart, 6-8 cm. deep, at a rate of 20 kg. per ha. (or up to 30 kg. per ha. on dirty land). Before sowing, its seed should be treated with 1.5% copper sulphate or Bordeaux mixture, and should be winnowed to remove thistle seed. Sowing should be done after danger of late spring frosts has passed, the second half of September being best, but sowing can be delayed until the second half of October in cold years.—N.G.S.

GENERAL

800 Raum, H. Die Unterschiede in der Kultur der Hauptgetreidearten. [**The differences in cultivation of the principal species of cereals.**] *Z. Pflanzenb. PflSch.* 1951, **2**, 131-42. [Tech. Hochsch., München-Weihenstephan]

This is a general article reviewing the fundamental differences in types of cereal and their cultivation. The paper begins with the fundamental differences between winter and summer forms and the different preparation of the ground which they require. Winter rye and winter wheat are contrasted as regards depth of sowing, time of sowing, and the spring cultivation which each requires. The particular characteristics of barley and of oats are mentioned. The four main cereals (rye, wheat, oats and barley) are then considered as regards their requirements in soil and manure, and rate of sowing. The paper ends with some notes on aspects of harvesting.—D.B.

801 Pfeiffer, R. Ergebnisse langjähriger Getreidesortenversuche im alpinen Raum. [**Results of long-duration cereal varietal trials under alpine conditions.**] *Veröff. Bundesanst. alp. Landw. Admont* 1951, No. 4, 20-42, bibl. 9.

From 1939 to 1949, 114 cereal variety trials were conducted, 63 at Admont and the remainder in 9 other localities in Austria, the Tyrol and Carinthia, at altitudes ranging from 620 to 1120 m. and with rainfall ranging from 670 to 1800 mm. The material was summer barley, oats, summer wheat, winter wheat and winter rye, principally Austrian indigenous and bred strains, although some German varieties were included in order to test their value for breeding. Results are summarized and the most successful varieties are listed in order of performance for the information of the farmer. —G.M.R.

802 Netherlands. Commission Gouvernementale pour la composition de la liste des variétés de plantes de grande culture. Vingt-cinquième liste descriptive des variétés de plantes de grand culture 1950. Variétés de céréales. [**Government Committee for the Compilation of the List of Field Crop Varieties. 25th descriptive list of field crop varieties 1950. Cereal varieties.**] pp. 53, Wageningen, 1950.

803 Maštakova, K. M. [**Drying of seed increases its germination and energy of germination.**] [Russian] *Selek. Semenovod.* 1952, **19**, 74-5. [Kalinin Sta. Breed. Sta.]

Observations in the autumn of 1949 showed that in he Vysokovskiĭ region cereal seed as received from the field frequently showed low germination and poor energy of germination. At the Kalinin State Breeding Station, barley harvested during the last few days of August gave germination 28.5% and energy of germination 11%; in the Lutescens 116 variety of winter wheat the corresponding figures were 80 and 43.5%, and in the Tulun 70 v/8 variety of spring wheat 81 and 19%. It was found that cereal seed which had been wetted during harvest and which could not be field-dried, showed a germination of up to 95% and an energy of germination of from 62 to 90%, after having been passed through a drier which reduced its moisture content to 14%.—R.P.J.

804 Timofeev, V. V. [**The yielding capacity of seeds which have been produced under different weather conditions.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 12, 56-8.

Results are reported of observations made during 1946/50 at the Ishemsk Varietal Trial Grounds in the northern zone of Komi ASSR on the influence of weather conditions in different years on the yielding ability of seeds of barley, oats and spring wheat. The yielding ability of the seeds depends primarily on the minimum temperatures during July, August and September, when the seeds are ripening. Temperatures below —3.5°C. during the phase of milk-ripeness to harvesting can reduce laboratory germination. Temperatures from —2° to —3.5°C. do not reduce laboratory germination, but lower the vitality of the seeds, and this is reflected primarily in field germination. The effect of unfavourable weather conditions in the northern zone of Komi ASSR can be minimized by sowing varieties which are biologically better adapted to local conditions. Only seed harvested in years with favourable weather conditions should be used for sowing.—R.P.J.

805 Anpilogov, M. Z. [**Disinfection of seeds from rusts.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 12, 47-50. [All-Union Inst. Plant Industry]

Subjecting germinating seeds of spring cereals to low temperatures is effective in controlling rusts. To free oat seeds from loose smut (*Ustilago avenae*) the germinating seeds should be subjected to temperatures of from 0° to 2° C. for 15 days; to disinfect barley from loose smut (*U. nuda*) and wheat from stinking smut (*Tilletia tritici*) the germinating seeds should be kept at temperatures of from —4° to —8°C. for 15 days.—R.P.J.

806 Agricultural Gazette of New South Wales. **The common grain moth (*Sitotroga cerealella*).** *Agric. Gaz. N.S.W.* 1951, **62**, 473-5.

The larvae of *Sitotroga cerealella* (also known as the Angoumois grain moth) feed on cereal seeds both in the field and in the store. Infestation of the grain can be prevented by clean harvesting and storing methods. Seed wheat may be protected from insect attack by treating it with powders of either magnesite (at 10 oz. per bu. of seed) or copper carbonate (at 2 oz. per bu.). Seed maize, stored as unhusked cobs, may be protected by dusting thoroughly with 5% DDT powder. Shelled seed maize may be protected in the same way using 2 oz. of powder per bu. of grain. Where infestation occurs in grain stored in silos, etc., fumigation may be undertaken with 5 lb. or 3 pt. of carbon bisulphide per 1000 cu. ft. of the container, irrespective of the amount of grain stored.—K.L.

807 BLACKMAN, G. E. **Selective phytotoxicity of synthetic growth regulators in wheat, oats and barley.** *Nature, Lond.* 1952, **169**, 229-30.

Synopses are given of papers read at a meeting arranged by the Crop Protection Panel of the Agricultural Group of the Society of Chemical Industry in November, 1951. The selective phytotoxicity of 2,4-D and MCPA in wheat, oats and barley was the subject of the symposium.—M.H.

808 GYSEL, A. Versuche über die Verwendung neuerer Unkrautbekämpfungsmittel. [**Experiments in the application of new herbicides.**] *Landw. Jb. Schw.* 1951, **65**, 684-702, illus. [Eidg. Agrikchem. Anstalt, Liebefeld-Bern]

Though the new herbicides kill the weeds, the expected increase in crop yield is not always realized. Spring cereals are susceptible to 2,4-D and related compounds in their early stages of development. The best stage for applying the herbicide was therefore investigated. Spring barley (Isaria) is most susceptible between the 19th and 36th day after sowing, and spring wheat (Huron) between the 36th and 46th day after sowing. The herbicide should therefore be applied as late as possible between tillering and earing. If grass/clover mixtures are grown with the cereal crop they should not be sown within 4 weeks of applying the herbicide to the cereal. Those sown within 14 and 22 days suffered considerably. Treatment of the soil before the sprouting of the crop (sugar-beet, maize, potato) provided no guarantee of protection for the crop against weeds.—D.B.

809 MCCLOY, J. **The drying of grain in bins.** *Fm Mech.* 1952, **44**, 15-18.

The moisture content limits for safe storage of wheat, barley and oats kept in bulk or in sacks, for periods up to 2 years are stated. Five graphs show the inter-relationship of the different variables involved when using in-bin drying plants, and a simple method for determining the temperature rise necessary to give the duct air the correct relative humidity is explained. The only instruments needed are a wet- and a dry-bulb thermometer and a duct thermometer.—C.L.S.

LEGUMES

SOYABEAN

810 SACHS, E. Bedeutung, langjährige Versuchsergebnisse, Anbaumöglichkeiten der Sojabohne. [**Importance, results of long-term trials and possibilities of cultivating the soyabean.**] *Jb. Bayern.* [n.d.], **26**, Nos. 3/4, 46-64. [Bayer. Landessaatzuchtanstalt, Weihenstephan]

Yields obtained over a long period at Weihenstephan, where varietal trials have been in progress, and at other places in Bavaria indicate that, as an oil plant, soyabean, is a poor competitor with other oil-bearing crops. Its great disadvantage is the uncertainty of its yield. Soyabean is "twice as uncertain" in its yield as winter rape. Crude fat and crude protein content are very variable and appear to be dependent on the plant environment.—D.B.

811 VERMA, A. B. S. and KOHNKE, H. **Effects of organic mulches on soil conditions and soybean yields.** *Soil Sci.* 1951, **72**, 149-56, bibl. 6. [Purdue Univ. Agric. Expt Sta.]

An experiment was carried out on a farm near Lafayette, Indiana, in 1948 and 1949, to determine the effect of organic and inorganic mulches on soyabean yield. Results showed that wheat straw and maize stover, as well as glass wool, increased soyabean yields, the average increase from the 3 mulches being 6 and 3 bu. per acre, respectively, in the 2 years, compared with no mulch. There were only slight differences between the yields from the 3 types of mulches. As all mulches decreased the summer temperature of the surface soil and increased the available soil moisture, it was concluded that soyabean yields were increased through the conservation of water.—E.B.O.

812 INDIAN FARMING. **Research on soyabean in the Punjab.** *Indian Fmg* 1950, **11**, Nos. 11-12, 547-8.

About 90 varieties of soyabean collected from India and abroad were tested in the years 1947-50. The erect and compact varieties ripened earlier than the erect and loose; the creeping types were late-maturing. The yellow-seeded varieties had a higher protein content than the black, chocolate or green-seeded ones. Natural shattering was absent in the Behrum varieties. Varietal trials showed that Punjab-1 was much superior to the other strains and yielded as much as 2791 lb. per acre. It has yellow, bold seed, is high-yielding, and easy to cook. The seed is free from bitterness and contains 43% protein and 20% oil. Optimum seed rates were 40 for the small and 70 lb. per acre for the medium to bold size, respectively. Average field germination of 50% was increased to 80% by soaking the seed in water for 12 hr. before sowing.—C.L.S.

813 NUGENT, T. J. and others. **Seed treatment and seed inoculation studies with soybeans.** *Plant Dis. Rep.* 1951, **35**, 82-3. [Virginia Polytech. Inst., Blacksburg]

To determine the effect on germination and seed yield, lots of Ogden soyabean seeds were: (a) left untreated, (b) inoculated with Nitragin, (c) treated with Arasan at 3 oz. per 100 lb. seed, and (d) treated with Arasan and then inoculated with Nitragin immediately before sowing. The seed was sown on 9 May. Establishment percentages on 14 June for treatments (a), (b), (c) and (d), were 60.5, 66.8, 77.8 and 75.9, while average yields in bu. per ac. were 40.92, 40.13, 41.05 and 42.02, respectively. Arasan significantly increased stand counts compared to treatments without Arasan. Arasan and Arasan + Nitragin treatments increased seed yields over those where no Arasan was used, but the differences were not significant. —P.J.B.

814 HARTWIG, E. E. and others. **Border effects in soybean test plots.** *Agron. J.* 1951, **43**, 443-5. [N. Carolina Agric. Expt Sta., Raleigh]

In trials with soyabeans to determine the effect of competition from border rows, the results indicated that 1-row plots will not give an accurate estimate of performance in areas where soyabeans produce rank growth. Multiple-row plots with 3, or 4 rows, with the border rows discarded, should give greater accuracy in varietal trials than 1-row plots.—From authors' summary.

GROUNDNUT

815 BOLHUIS, G. G. De invloed van klimaatsomstandigheden op het uitleverings-percentage, vetgehalte en eiwitgehalte van de aardnoot, speciaal wat betreft de variëteit Schwartz 21. [**The influence of climatic conditions on the shelling percentage, oil and protein content of the groundnut, with special reference to the variety Schwartz 21.**] *Landbouwk. Tijdschr.* 1951, **63**, 735-41, bibl. 9, English summary pp. 740-1. [Lab. v. Trop. Plantenteelt, Wageningen]

In trials at Buitenzorg, Java, the weight ratio of shelled to unshelled Schwartz 21 groundnuts varied more during the west monsoon than during the east monsoon. In no cases were the differences great, though it is concluded that these ratios cannot be regarded as characteristic of the variety. The oil protein ratio of the nuts varied more during the east than during the west monsoon, the variations being between 1.5 and 1.7. In samples with divergent high, or low, oil protein ratios, a high protein content appeared to be correlated with a low oil content, and vice versa. A comparison is made of the results from Buitenzorg with those published in the USA.—P.J.B.

816 MORIYA, N. and others. [**Studies on the two-sided utilization of crops as foods for men and animals. I. The peanut.**] [Japanese] *Bull. Nat. Inst. agric. Sci.* Ser. G. 1951, No. 2, 109-13, bibl. 4, English summary p. 113.

The variations in the yield and composition of groundnuts were studied every 10 days between 30 August and 28 November [year not given]. No significant changes in chemical composition of the leaves and stem occurred during the period. The optimum time for harvesting in Southern Kanto, Japan, is towards the end of September. —From authors' summary.

817 UNITED STATES Department of Agriculture, Agricultural Research Administration. R.A.S. 144 (c). **New moisture determination gives more accurate check on peanut value.** 1951, pp. 2.

A note is given on an improved method of determining the moisture content of groundnuts. Two determinations are made, the first of which is a moisture-content determination of the whole nuts immediately on receipt and the second a moisture determination of the nuts after grinding them for oil and protein analysis. This method permits accurate calculation of the amount of oil and protein in groundnuts on receipt of samples and is now a standard analytical procedure in the USA.—P.J.B.

818 ORGIAS, A. Recherches préliminaires sur le système radiculaire de l'arachide. [**Preliminary investigations on the root system of groundnuts.**] *Oléagineux* 1951, **6**, 571-5, bibl. 4, illus.

At Thiès, Senegal, in 1950, the root systems of groundnuts growing in light soil were examined at 18, 26, 36, 47, 80, 98 and 114 days after sowing. Two development stages were distinguished: (1) the first 47 days, during which the lateral roots developed horizontally but only in the top 25 cm. layer of soil, and (2) from the 48th day, when many of these roots changed their direction and grew downwards to explore the lower soil layers to a depth of 50 cm. and below. The roots continued to grow up to 114 days after sowing, i.e.

until harvest, but the localizing of root growth in the first stage helps to explain the good results obtained from applying pelleted fertilizers.—C.L.S.

819 GREENWOOD, M. **Fertilizer trials with groundnuts in Northern Nigeria.** *Emp. J. exp. Agric.* 1951, **19**, 225-41, bibl. 12, illus. [Dept Agric., Zaria, Northern Nigeria]

Field experiments made with groundnuts between 1947 and 1950 have shown that :—(1) Pellets or granules of various phosphates can be safely placed with groundnut seed, provided that there is a lateral separation of 0.5 in. between seed and fertilizer. (2) Highly economic returns can be expected in the year of application from the use of 11 lb. P_2O_5 per acre. Notable long-term residual effects have been obtained from single superphosphate. (3) Single superphosphate has proved more efficient than other types of phosphate, particularly in haulm production. Its superiority has been shown to be due to its content of gypsum. (4) On some soils gypsum has a direct effect on both kernel and haulm production ; on others its effect arises only by interaction with phosphate. The possibility of sulphur deficiency is being investigated. (5) Nitrogen supplied as monammonium phosphate has a stimulatory effect on seedling growth ; it has given no significant increases in kernel or haulm yields.—Author's summary.

820 BUNTING, A. H. **Land development and large scale food production in East Africa by the Overseas Food Corporation.** *Econ. Bot.* 1952, **6**, 55-68, bibl. 15. [Res. Div., Minist. Agric., Wad Medani, Anglo-Egyptian Sudan]

A review is given of the groundnut scheme in Tanganyika.—P.J.B.

821 BUNTING, A. H. **Lessons of the Groundnut Scheme.** *Times Survey Brit. Agric.* 1951, December, p. 15.

The author outlines the achievements of the land-use survey made in 1949-50 following the decision to restrict the agricultural production of groundnuts in Tanganyika to an area of 150,000 acres. During the past 5 years much knowledge has been gained for the solution of the technical problems involved, notably in regard to conserving soil moisture, the use of suitable rotations, the control of diseases and pests, and the rational use of machinery and fertilizers. The experience gained has confirmed that much of the present waste land of tropical Africa can be developed for agriculture. [From *Herb. Abstr.*]—M.H.

822 CAMERON, J. F. and others. **Pilot-scale crop costings on groundnuts, sorghum, and maize at Urambo Experimental Station, Tanganyika Territory, 1949-50.** *Emp. J. exp. Agric.* 1951, **19**, 265-74. [Overseas Food Corporation, Kongwa and Urambo]

A trial analysis of the costings for 82 ac. of crops showed groundnuts to be the most profitable crop, though they require more mechanization and labour and involve higher costs generally than do cereal crops. Maize and sorghum should be grown in addition to groundnuts so as to achieve a more balanced distribution of labour throughout the season.—K.L.

823 GUYOT, S. L'économie de l'arachide au Sénégal. Les problèmes humains. [**The economics of groundnuts in Senegal. The human problems.**] *Oléagineux* 1952, 15-19, and 75-80, illus.

This article is based on a thesis for a doctorate, " La traite des arachides dans le pays de Kaolack et ses conséquences économiques, sociales et juridiques " [The groundnut trade in Kaolack country and its economic, social and juridical consequences], by J. Fouquet.—E.B.O.

824 OLLAGNIER, M. Forme, dimension des parcelles et nombre de répétitions dans les essais culturaux sur arachide et sur palmier à huile. [**Shape, size of the plots and number of repetitions in cultural trials with groundnuts and oil-palm.**] *Oléagineux* 1951, **6**, 707-10, bibl. 6.

The results of a uniformity trial with groundnuts carried out in Senegal, Thiès region, in 1950, indicated that : (a) the length of trial plots should be 4 times their width ; (b) the size of each plot should not exceed 50 sq. m. ; (c) 10 or more repetitions should be made. [See also *Fld Crop Abstr.* 4 : 915.]—E.B.O.

PEA

825 CRUICKSHANK, I. A. M. **Pea-wilt in New Zealand.** *N.Z.J. Sci. Technol.* 1951, **33**, No. 4, 75-80, bibl. 1. [Dept Sci. Industr. Res., Christchurch, N.Z.]

Of 24 pea varieties tested for infection by *Fusarium orthoceras* var. *pisi*, the field varieties Marathon, Harrison's Glory, Blue Prussian and Mammoth White are resistant to the disease in New Zealand.—M.H.

826 LAMPRECHT, H. Genanalytische Studien zur Artberechtigung von *Pisum humile* Boiss, et Noë. [**Genetic studies on the determination of the species of *Pisum humile* Boiss. et Noë.**] *Agric. Hort. Genet.* 1951, **9**, 107-34, bibl. 43.

The botanical characters and the results of cytological and genetic studies of the relation between

Pisum humile and *P. sativum* are discussed. It is concluded that *P. humile* is only a variety of *P. sativum*.—From author's summary.

BEAN

827 NETHERLANDS. Wageningen Institute for Research on Crop Varieties. Veldbonen, 1951. [**Field beans, 1951.**] *Bericht over Rassenkeuze* 1951, No. 98, pp. 3.

Data are given of the yield, in the Netherlands, of Adrie, Mansholt's and Fries-Groningse Waal beans, Mansholt's and Wierboon C.B. Wier beans, Oldambtster, Rinal and Bunica horse beans and Niki tick beans. A short description is given of each variety. Among the Waal beans, which have the largest seeds of the above 4 types, the shortest straw and are earliest in maturing, Adrie is the most widely grown and comprised 13% of the total area under beans in 1950. This type of bean is mostly grown in Friesland. The Wier beans are the highest yielding of the 4 types and are mainly grown on the western clay soils. The type is earlier in maturing than the horse beans and has stiffer straw. In 1950, Mansholt's Wier bean and Wierboon C.B. comprised 11 and 51% of the total acreage under beans. Horse beans are widely grown, but are most important in Groningen. In 1950, Oldambtster and Rinal each occupied 13% of the total bean acreage. The tick beans, of which only the variety Niki is accredited, yield less than the other types and are not so widely grown, but are grown on a wide variety of soils.—P.J.B.

828 STARR, G. H. and others. **Antibiotics for bean blight control.** *Agron. J.* 1951, **43**, 617. [Wyoming Agric. Expt Sta., Laramie]

Bean seeds, placed for 30 min. in a 1 : 7 liquid latex-water solution and then in a solution of 1 part of streptomycin per 100 parts water for 60 min., were effectively protected against bacterial blight (*Pseudomonas phaseoli*). The latex prevented the seed coat from slipping. It is thought that such a technique can be of use for small lots of seed to be grown for multiplication and that crude, non-sterilized antibiotic material can be used. Field tests of this technique are in progress in Wyoming.—P.J.B.

829 LÖHNIS, Marie P. **Manganese toxicity in field and market garden crops.** *Plant & Soil* 1951, **3**, No. 3, 193-222, bibl. 25, illus. [Wageningen]

In 1940, on plots at Wageningen, an injury to the foliage of bean plants (*Phaseolus vulgaris*) was noted. Investigations from 1943-8 showed that similar symptoms were due to an excess of manganese. Determinations of the Mn content of beans growing in the plots were carried out over several years and in healthy young leaves the value ranged from 49-940 Mn ppm dry matter and, in affected leaves, from 1104-4261. At high temperatures bean plants grown in a culture solution appeared to tolerate a high Mn content in the foliage without visible injury. The amount of exchangeable manganese in soil in the plots appeared to vary widely, but no correlation was found between these values and the Mn content of the bean leaves. As a soil test for Mn excess, *Ph. vulgaris* may prove valuable as a test plant. The effects of Mn excess on flax, potatoes, mustard, oats, mangolds and peas are also reported.—C.L.S.

CHICK PEA

830 CHAVAN, V. M. and ARGIKAR, G. P. **Three new economic types in Bengal gram** (***Cicer arietinum* L.**). *Indian Fmg* 1950, **11**, 539-40, bibl. 6, illus.

In the course of pulse breeding work at Dharwar and Bailhongal in the State of Bombay, 3 new types of Bengal gram were obtained. The first, Bada Chana, is similar to the strain Chapa, but has a larger seed. The second, Hiriva Chana, is a type with green wrinkled seed giving a green flour, whilst the third [unnamed] is a mutation of Chapa gram and has a spreading habit which may make it a useful cover crop for dry regions or an ideal second crop after rice.—C.L.S.

GENERAL

831 NETHERLANDS. Commission Gouvernementale pour la composition de la liste des variétés de plantes de grande culture. Vingt-cinquième liste descriptive des variétés de plantes de grand culture 1950. Variétés de légumineuses à grains. [**Government Committee for the Compilation of the List of Field Crop varieties. 25th descriptive list of field crop varieties 1950. Pulse crop varieties.**] pp. 36, Wageningen, 1950.

ROOTS

SUGAR-BEET

832 ROOS, P. **Progress in the British sugar beet industry. Some comparisons with Continental practices.** *Times Survey Brit. Agric.* 1951, December, p. 9.

Sugar-beet was grown on the European Continent about a century before production began in Britain. The high yields obtained on the Continent are due partly to the high numbers of plants per acre (30,000 to 35,000). In Britain, where the plant population per acre is about 20,000, yields of beet and sugar per acre during 1941-5 were 9.16 tons and 29.94 cwt. respectively. During 1946-50, these figures rose to 10.49 tons and 34.40 cwt. In Britain, mechanical harvesting and the measures taken to obviate diseases and pests are both in advance of the practices of Continental growers. The more efficient use made on the Continent of sugar-beet crowns and leaves for stock feed is now being copied in Britain. The author discusses factory problems and outlines the measures for shortening the manufacturing season.—M.H.

833 Jorritsma, J. Enkele actuele vraagstukken in de suikerbietenteelt. [**Some topical questions on the cultivation of sugar-beet.**] *Landbouwk. Tijdschr.* 1951, **63**, 594-602, English summary pp. 601-2. [Inst. Rat. Suikerprod., Bergen op Zoom]

Among the topics discussed are: seed bed preparations, segmented and rubbed seed, seed treatment, seed drills and root development.—P.J.B.

834 Lindenbergh, P. **The effect of leaving topped sugar beet in the soil before lifting.** *Meded. Inst. rat. Suikerprod.* 1950, **20**, 22-34.

Two trials were laid down in the Netherlands to investigate the effect on root weight and sugar content, of leaving sugar-beet in the soil for different periods before lifting. The results of the first trial were as follows: where sugar-beet remained in the soil for 1 week after topping, the average weight per root increased by 50 g., but the sugar content decreased by 1%; the sugar yield did not alter significantly. After 2 weeks from topping, the average root weight declined somewhat, the sugar content declined by a further 0.3% and the sugar yield declined considerably. In the second trial, leaving the sugar-beet in the ground for 1 week after topping resulted in a decline of 0.7% in sugar content. After 2 weeks, sugar content declined by 1.2%. The results indicated that leaving topped sugar-beet in the ground resulted in a continuous decline in sugar content from the time they were topped. Weather conditions had a considerable effect on sugar losses. Losses were highest during dry, warm weather. Wet conditions caused a considerable initial rise in the weight of individual roots after topping.—P.J.B.

835 Coons, G. H. and others. **Report of the 1950 tests of U.S. 216MS × 226, U.S. 225MS × 226, and other varieties from sugar beet leaf spot resistance breeding of the U.S. Department of Agriculture.** *Proc. Amer. Soc. Sug. Beet Technol. Eastern U.S. and Canada 1951.* 1951, pp, 72-8. [Sug. Plant Invest. Div., Plant Industry Bur., U.S. Dept Agric.]

The results are presented of trials, at 17 locations in Canada and the U.S., with a number of hybrid, synthetic and local sugar-beet varieties.—P.J.B.

836 Moens, A. Doelmatige werkmethoden in de suikerbietenteelt. [**Efficient management of the sugar-beet crop.**] *Landbouwk. Tijdschr.* 1951, **63**, 603-14, English summary pp. 613-14. [Inst. Landbouwtech. en Rationalisatie, Wageningen]

Methods of reducing the labour needed for singling and harvesting sugar-beet are reviewed. In comparative trials, the use of rubbed seed entailed 20 to 30% less man-hours at thinning than the normal seed. The use of a precision drill with rubbed seed did not significantly reduce the labour requirement compared with ordinary seed drills sowing rubbed seed. The economics of different types of mechanical sugar-beet harvesters are compared with hand-lifting.—P.J.B.

837 Rayns, F. **Thinning root crops.** *J. roy. agric. Soc.* 1951, **112**, 50-61. [Norfolk Agric. Sta., Sprowston, Norwich]

Some of the measures recommended to facilitate the singling of root crops include: (a) drilling at low seed-rates using drills designed to deposit seeds singly and uniformly in the ground; (b) the breeding of single-germ seed of mangolds and sugar-beet, and the rubbing and grading of seeds of irregular size; (c) mechanical thinning by cross-blocking or by the use of an American thinner.—K.L.

838 Harvey, P. N. **Processed sugar beet seed.** *J. Minist. Agric.* 1952, **58**, 458-63. [Norfolk Agric. Sta., Sprowston]

The respective merits and faults of acid-treated, segmented and rubbed sugar-beet seed are reviewed. The segmenting of seed has resulted in considerable seed wastage and low germination in the field. The results are given of trials in Norfolk with rubbed seed. Seed rubbed to a diameter of 7/64 to 8/64 in. had, over a 3-year period, an average germination of 61% and produced 77% of single plants, compared with 74 and 39%, respectively, for seed rubbed to a diameter of 10/64 to 11/64 in. The vigour of the smaller seed was lower than that of the large seed. From a sample of natural seed, after rubbing, 43% fell into the 9/64 to 10/64 range of diameter, 6% into the 7/64 to 8/64 and 27% into the 10/64 to 11/64 in. range. In comparisons with untreated seed over a 3-year period, the germination of rubbed and untreated seed was 69 and 67% and the percentage of single plants obtained, 53 and 43%, respectively. 11 lb. of rubbed seed has been found equivalent to 15 lb. of natural seed for sowing a given acreage. In 65 trials at a number of locations, the use of rubbed seed has reduced by 8 to 10% the time taken to single a given area, as compared with untreated seed. This saving in time is regarded as an underestimate. The use of pre-emergence herbicides is regarded as a possible method of saving the time taken to hoe weeds growing close to the seedlings at thinning time: this would enable fuller use to be made of the advantages of rubbed seed.—P.J.B.

839 BOCKSTAHLER, H. W. and HOGABOAM, G. J. **Black root resistant sugar beet varieties.** *Proc. Amer. Soc. Sug. Beet Technol., Eastern U.S. and Canada 1951.* 1951, pp. 68-71. [Sug. Plant Invest. Div., Plant Industry Bur., U.S. Dept Agric.]

In 10 trials located in Minnesota, Ohio, Michigan and Ontario, the average yield of 48B3-00 sugar-beet on soils containing different amounts of black root (principally *Aphanomyces cochlioides*) infestation was 13% higher in sugar and 11% higher in roots per ac. than that of the commercial variety U.S. 215 × 216/3. Where black root infestation was severe, the yield differences were much greater. A second black-root resistant variety was also compared with U.S. 215 × 216/3 and a synthetic check (486-0) in Ohio and Michigan. On non-infested soils, there was little difference in yield between the varieties. In two trials in Michigan on infested soil, 49B10-00 outyielded U.S. 215 × 216/3 by 75 and 61%, 49B10-00 yields being slightly higher than those of 48B3-00. Two other hybrid seed lots, 49B13 × 2 and 49B16 × 2 gave higher root yields on disease-infected soil than 49B10-00 and 48B3-00 and outyielded U.S. 215 × 216/3 by 141 and 102%, respectively.—P.J.B.

840 BALDONI, R. Prove di lotta agli elateridi con l'esaclorocicloesano. [**Trials for controlling wireworms with hexachlorocyclohexane.**] *Industr. saccar. ital.* 1951, **44,** 281-7, bibl. 28. [Ist. Agron., Univ. Bologna, Italy]

Trials were carried out in Padova and Ravenna provinces, Italy, in 1950, to test HCH applied by different methods, and at different rates, for controlling wireworms in soil under sugar-beet. Results from these trials showed that: (a) HCH as well as insecticidal properties has a depressing effect on beet growth; both effects were shown by plant counts, although yields were not significantly affected; (b) the phytotoxic effect, causing plant losses in the first stages of growth, especially when conditions were not favourable for rapid plant growth, was shown both by the commercial HCH and the pure γ isomer; the surviving plants developed normally; (c) the lowest phytotoxic effect and the highest insecticidal effect were obtained from broadcasting small quantities of HCH on the soil (30 kg. of commercial 10% HCH per ha. = 450 g. of γ isomer per ha.); (d) almost as good results as in (c) were obtained from dusting the seed with small doses of 20% HCH (1 to 1.5 kg. per q. of seed), a treatment which is more economical than (c) and also avoids danger from soil poisoning; (e) the strongest phytotoxic effect was obtained from applying HCH in the granulated form close to the seed.—E.B.O.

841 GHIDINI, G. M. L'impiego dell' elicottero per la difesa della bieticoltura italiana. [**The use of the helicopter for protecting Italian sugar-beet crops.**] *Industr. saccar. ital.* 1951, **44**, 275-80.

A trial to control *Cleonus* spp., *Lixus junci* and *Cassida* sp. on sugar-beet crops with hexachlorocyclohexane and Chlordane, applied by "spraycopter" and ground machines, was carried out in the Agro Pontino, Italy, in 1951, on an area of 4000 ha. This was the first time that the "spraycopter" was employed for controlling crop pests in Italy. The infestation by *Cleonus* and *Lixus* was serious, while that by *Cassida* was limited. As Chlordane, at the beginning of the trial, proved superior to hexachlorocyclohexane for controlling *Cleonus* and *Lixus*, the trial was concluded with Chlordane only. This preparation gave good control of all the above-named pests when applied early. The "spraycopter" proved to be highly efficient for applying insecticides, and was superior, in this respect, to the ground machines.—E.B.O.

842 ROETCISOENDER, T. **The effect of injury to sugar-beet leaves.** *Meded. Inst. rat. Suikerprod.* 1950, **20**, 34-6.

Trials were laid down, in the Netherlands, to investigate the damage that hail can cause to sugar-beet. In trial (a), one plot of sugar-beet was half stripped of leaves artificially, while another was completely stripped of leaves, both on 9 June. A control plot was left undamaged. In trial (b), the same treatments were carried out on 3 July on another set of plots. In the following September, there was little visible difference between the plots in trials (a) and (b). There were clear differences between the root weight and sugar yield of damaged and undamaged plants. In trial (a), the root and sugar yields of the controls was 8200 and 1600 kg. per ha. higher, respectively, than the plants whose leaves were totally removed. In trial (b), the respective yield differences were 11,000 and 1800 kg. per ha. The sugar content of the plants on plots where the leaves were all removed was about 0.5% lower than that of the control plants. The results indicate that up to a point, the later in the season that hail damage occurs, the greater the losses.—P.J.B.

843 SCARAMELLA-PETRI, Piera. Nota preliminare sul rapporto tra la struttura dei piccioli fogliari e il contenuto in zucchero in *Beta vulgaris*. [**Preliminary note on the relation between the structure of leaf-stalks and the sugar content of *Beta vulgaris*.**] *Nuovo G. bot. ital.* 1950, **57**, 667-8. [Ist. bot. Univ. Bologna, Italy]

The examination of 5 varieties of *Beta vulgaris* showed that the structure of the vascular bundles and their distribution in the leaf-stalks is constant for each variety and is independent of the age of the plant. The fodder-beet varieties, with low sugar content, have thick leaf-stalks with few bundles and reduced phloem, while the sugar-beet varieties with high sugar content have leaf-stalks with a greater number of bundles and more differentiated phloem.—E.B.O.

844 PROCHÁZKA, F. Pokusy s jarovisováním řepného semene. [**Experiments with vernalization of sugar-beet seed.**] *Sborn. čsl. Akad. Zeměd.* 1951, **24**, 171-5, English summary p. 175. [Czechoslovakia]

Vernalization was effected in two ways, namely, by direct sowing in the open during the autumn and winter months, and by subjecting the seed to vernalization [details of treatment not given in summary] before sowing. The latter method is the more effective for increasing yields. The author advocates a more extensive use of vernalized seed, especially sugar-beet.—M.H.

JERUSALEM ARTICHOKE

845 DIEHL, R. and others. Recherches sur le topinambour. [**Researches into the Jerusalem artichoke.**] *Ann. Inst. nat. Rech. agron.* Sér. B. 1951, **1**, 336-54, bibl. 6, illus. [Sta. Amélior. Plantes, Ecole Nat. Agric., Rennes]

The investigation has as its final aim the improvement of the more widely cultivated varieties of *Helianthus tuberosus*. The present study is a preliminary one and is concerned with the shape and distribution of the tubers, their earliness, productivity and chemical composition. Violet ordinaire and Blanc précoce have shown themselves to be the desirable varieties both because of the good grouping of the tubers, which facilitates lifting, and their high yields. Improved varieties of Jerusalem artichoke furnished, on an average, higher quantities per hectare of dry matter, carbohydrates, proteins and fodder units than did sugar-beet and potato.—D.B.

POTATO

846 EDINBURGH and East of Scotland College of Agriculture. Misc. Publ. No. 75. **The potato in health and disease.** By *G. M. Stuart.* [n.d.], pp. 8.

This is a short historical and general account of the various aspects of potato growing in Great Britain from the 16th century to the present day. —K.L.

847 THOMAS, W. L. **Early potato cultivation: the chief aspects of earliness and quality.** *J. Minist. Agric.* 1951, **58**, 429-34.

A review is given of practical considerations in the production of high quality early potatoes.—P.J.B.

848 HAWKES, J. G. **The Commonwealth Potato Collection.** *Amer. Potato J.* 1951, **28**, 465-71, bibl. 8. [School Agric., Cambridge, England]

A brief account is given of the history of this collection and of the work involved in establishing, maintaining and studying it. The collection numbers some 2500 lines of indigenous American potato species and varieties.—A.G.G.H.

849 NOTTINGHAM UNIVERSITY, School of Agriculture. **Key for the identification of commercial potato varieties and rogues in the field. (United Kingdom).** By *N. McDermott.* 1951, pp. 67. [Sutton Bonington, Loughborough]

The object of this publication is to provide a simple means of identifying potato varieties during the growing season.—Extract.

850 STEWART, G. F. and others. **New [potato] varieties released. Cherokee.** *Amer. Potato J.* 1951, **28**, 642-3. [Iowa Agric. Expt Sta.]

Cherokee was tested under the pedigree number B 61-3, a selection from (X96-56) × (X528-170). In tests in Maine, B 61-3 was found to be resistant to the common physiological races of late blight and highly resistant to scab. Cherokee is a mid-season potato, normally maturing about 10 days later than Cobbler. In Iowa, during a 3-year period, Cherokee produced an average of 566 bu. per acre of No. 1 potatoes.—E.B.O.

851 SALTER, R. M. and TIEDJENS, V. A. **New [potato] varieties released. Pungo.** *Amer. Potato J.* 1951, **28**, 641. [Virginia Truck Expt Sta., Norfolk]

Pungo, which was tested under the pedigree number B 76-43, a selection from 96-44 × 528-170, was immune to the common physiological races of late blight in tests in Maine, but showed no appreciable resistance to scab. In Maine, Pungo usually matures later than Irish Cobbler, but at Norfolk, Virginia, they were both harvested 106 days after planting and Pungo yielded 25% more than Irish Cobbler. At Onley, Virginia, Pungo, grown with 10 in. of rainfall, yielded 75% more than Irish Cobbler.—E.B.O.

852 LIVERMORE, J. R. **The Canoga potato.** *Amer. Potato J.* 1951, **28**, 672-4. [Cornell Univ., Ithaca, N.Y.]

A description is given of the variety Canoga, bred from Katahdin × (Albion × Katahdin) and released in 1950. A table shows the yield and specific gravity of Kennebec, Canoga, and Essex, grown experimentally in 5 different counties in New York State in 1949, the average yield of the 3 varieties being 466, 425 and 385 bu. per acre, respectively.—E.B.O.

853 HARDENBURG, E. V. **Effect of various methods of handling seed potatoes in preparation for planting.** *Amer. Potato J.* 1951, **28**, 525-9, bibl. 1. [Cornell Univ., Ithaca, N.Y.]

In a series of replicated trials, carried out from 1945 to 1950 with seed potatoes, various methods of treatment and storage during 3 to 4 weeks prior to planting were compared to assess their effect on weight loss of seed, speed of emergence and total yield. These treatments included: (a) dusting fresh-cut seed with ground limestone prior to dry storage; (b) dry storage of cut seed uncured and undusted; (c) curing cut seed in a storage room where humidity was kept high for a few days and temperature maintained at approximately 60 to 65°F.; (d) greensprouting of stored uncut seed; (e) treatment of fresh-cut seed with the hormone Tubertone; and (f) fresh-cut untreated seed, the control. The Green Mountain variety was used in 1945, Sebago in 1947 and Katahdin in the last 3 years. The 3 treatments, requiring storage of cut seed for 3 to 4 weeks, resulted in an average loss of 14 to 16% in weight, but this loss was not reflected in the ultimate yields. The greensprouted seed lost an average of 6.5% in weight during treatment. Stand counts taken within 3 weeks after planting showed that greensprouting was the only method which consistently increased the speed of emergence, but only in 1 of the 5 years was this difference reflected in a significantly higher yield. On the basis of yield increase, none of the methods tested seems to be justified. Curing of cut seed might be an advantage where it is necessary to store it for a long period before planting and when seed-bed conditions are unfavourable.—E.B.O.

854 ABBISS, H. W. and CRAZE, S. P. **Influence of storage and production temperatures on some horticultural crops.** *J. Minist. Agric.* 1952, **58**, 471-7.

In view of the often late arrival of seed potatoes in many areas of Britain where early potatoes are grown, trials were carried out at Penzance during one year to determine the efficacy of heat treatment for breaking the dormancy of seed potatoes. The sprout emergence of seed stored in sheds at normal temperature took place on 5 May; the yield from such seed on 27 June was 66 lb. per 100 plants. Where the seed was warmed to 85°F. for 12 days prior to sowing, the sprouts emerged on 18 April and the yield per 100 plants was 86 lb. Where the seed was cooled to 35°F. for 4 days, warmed to 95°F. for 4 days and then cooled to 35°F. for 4 days before sowing, sprout emergence took place on 30 April and the yield per 100 plants was 68 lb. These results indicate a method of breaking the dormancy of seed potatoes when they arrive late on the farm.—P.J.B.

855 GOBELEV, D. P. and ANTIPOV, N. I. [**Pre-planting treatment of potato tubers with fertilizers.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 12, 63-4. [Rjazanksii Sta. Ped. Inst.]

Mixtures consisting of varying proportions of silt + superphosphate, silt + potassium nitrate and silt + potassium chloride were made into a semi-fluid with water. Potato tubers of the Lorh variety were cut in half; one half of each tuber was dipped in the mixture and the other half kept as a control. The experiment was conducted with six replications on plots 1 cubic metre in size. The results obtained following treatment with silt + superphosphate are presented in tabular form. [No results are given for silt + potassium nitrate and silt + potassium chloride.] 80% silt and 20% superphosphate produced crops with the largest weight per tuber. 60% silt + 40% superphosphate raised the yield by increasing the number of tubers. Pre-planting treatment of the tubers with a mixture of silt and superphosphate increased the yield on an average by 75% compared with control.—R.P.J.

856 EMILSSON, B. and GUSTAFSSON, N. Behandling av utsädespotatis med gronings-hämmande medel. [**Treatment of seed potatoes with sprout-inhibiting chemicals.**] *K. LantbrAkad. Tidskr., Stockh.* 1951, **90**, 245-56, bibl. 12, English summary p. 255.

Trials were carried out during 1949 and 1950 to determine the effect of a naphthaleneacetic acid methyl ester (MENA) in Regulex and of tetrachloronitrobenzene (TCNB) in Fusarex, used in sprout-growth inhibiting treatments, on the emergence, development, frequency of missing plants, yield and tuber-size of potatoes. The results showed that MENA reduced yields to such an extent as to make it unsuitable as a treatment for seed potatoes under Swedish conditions. With TCNB, sprouting was delayed somewhat as compared with untreated potatoes and yields were reduced slightly. Where TCNB is used under Swedish conditions it is recommended that not more than 12 g. of TCNB per 100 kg. potatoes be used and that the treatment be made not later than 1 January. The treated potatoes should be chitted for at least 2 weeks before planting. It is stressed that the reactions of potatoes to sprout-inhibiting chemicals may be unfavourable under conditions other than those used in these trials and that varietal reactions may also differ.—P.J.B.

857 PAYNE, Merle G. and others. **The effect of storage on colour and sprouting of Red McClure potatoes after 2,4-D treatment.** *Amer. Potato J.* 1951, **28**, 455-64, bibl. 12. [Agric. Expt Sta., Colorado Coll., Fort Collins]

The intensified red skin-colour of Red McClure potatoes, produced by treating growing plants with the Na salt of 2,4-D at rates of one-third and 1 lb. per acre, persisted throughout a 6-month storage period. Treatment produced potatoes with a significantly lower average weight of sprouts and with significantly more sprouts than the controls. When treated and control tubers were desprouted and planted, there were no significant differences in stand, number of stems per plant or yield.—From authors' summary.

858 FRÉZAL, P. and GERBINOT, B. Actions de la monochlorhydrine du glycol et du bromure de méthyle utilisés sous pression atmosphérique et sous vide partiel sur la période de vie latente et sur la germination des semences de pommes de terre. [**Action of glycol monochlorhydrin and methyl bromide, used under atmospheric pressure and partial vacuum, on the latent period and sprouting of potato setts.**] *C. R. Acad. Agric. Fr.* 1951, **37**, 15, 556-61, bibl. 7. [Serv. Protect. Vég.]

These chemicals break the latent period of seed potatoes prematurely and stimulate their sprouting. The treatment (amount and duration) depends on the technique employed, the variety of potato and the condition of the setts. There is a risk of poisoning the plant. This risk is least when the chemicals are applied under partial vacuum. The treatment described makes it possible to advance the date of sprouting in certain varieties (Furore, Royal Kidney and Bintje) by 1 month. The treatment can be carried out on the farm.—D.B.

859 GALLAY, R. and MUENSTER, J. Les efforts entrepris pour améliorer la qualité des plantes indigènes de pommes de terre. [**Efforts to improve the quality of indigenous potato plants.**] *Rev. romande* 1951, **7**, 91-3, illus. [Sta. féd. d'essais et de contrôle de semences, Mont-Calme, Lausanne]

A brief account is given of the conditions to be complied with for the certification of seed potatoes. The minimum surface for inspection is 20 ares in the lowlands and 15 ares on mountains. For certification in category A, the number of plants affected with virus disease must not exceed one per are, for category B, four per are. For seed potatoes to be included in category A, tops must be removed by a date decided on by the authorities. Selections of seed potatoes are not made from those areas in south-west Switzerland where the virus-bearing aphis multiplies, i.e. Canton Geneva, the shores of Lake Geneva and Lake Neuchâtel and certain parts of the Rhone valley. As a further measure of selection, during the winter preceding sowing, one eye from each potato of a sample (say 100) is allowed to germinate under controlled greenhouse conditions. The resulting plants are observed for virus disease and there is a further elimination of those unsuitable for selection. Regulations require that for every bulk lot of seed potatoes sold, there must be a corresponding demonstration plot of 100 potato setts. The Federal Stations are then in a position to judge the quality of the product, particularly as regards virus infection and yield.—D.B.

860 WERNER, H. O. and SANDSTED, R. F. **Performance of scab resistant potato varieties in western Nebraska.** *Amer. Potato J.* 1951, **28**, 645-58, illus. [Nebraska Univ., Lincoln]

Three late varieties, Ontario, Menominee and Cayuga, produced fewer scabby potatoes than any other of the commercial varieties tested during 2 years in a number of dryland and irrigated tests in western Nebraska. Because of grade inferiorities, due to rough and immature tubers, they are of promise for commercial production on only a limited number of irrigated farms where scab is usually very prevalent. On dryland the same defects occurred, but the yields of US/1-A size potatoes averaged higher than with the commonly grown Triumph. Scab was more prevalent with Yampa and Russet Sebago than with the previously mentioned varieties. However, both appeared of dubious commercial value for irrigation—Yampa, because of hollow heart, growth cracks and sun-greened tubers and Russet Sebago because of immaturity, one aspect of which was spotted russeting. On dryland, Yampa tubers were of reasonably good quality with the average production of U.S.1 tubers being greater than with any of the other varieties, but Russet Sebago was least productive. Progress appeared to be the most desirable of the varieties in this test because the tubers possessed a red skin colour with a relatively low incidence of mild types of scab, were free from harvest cracks, and made a pleasing market appearance with good table-quality. In fields where scab was very severe, Progress, at times, show less scab than Russet Sebago. Triumph produced a higher percentage of scabby tubers with more scab of severe types than any of the varieties in these tests. The average specific gravity of tubers was higher with all these varieties than with Triumph.—Authors' summary.

861 Mihaĭlova, V. N. and Česnokov, N. S. [**Wilting of potatoes in the south of the USSR and measures for controlling it.**] [Russian] *Selek. Semenovód.* 1951, **18**, No. 5, 19-26. [Rostov, Potato Breed. Sta.]

Fusarium wilt of potatoes in the southern regions of the USSR is mainly due to unfavourable external conditions (high temperatures of the soil and air, ow relative humidity of the air, drought, etc.). High temperatures weaken the plant and cause premature ageing of the tissues, which is manifested by browning of the underground part of the main stem. The Fusarium fungus penetrates into the browned portions of the tissues. Observaions in 1947/1950 showed that the variety Voljtnan, which has a powerful root system, is highly resistant to wilting in the south of the USSR; he varieties Kurjer and Rannaja Roza occupy an ntermediate position, and the variety Lorh, which has a weaker root system, showed the lowest esistance. Varieties to be used in the breeding of wilt-resistant varieties are indicated, and recommendations are made regarding selection of plantng material, time of planting, and manuring.—.P.J.

62 Emilsson, B. Bekämpning av bladmögel och brunröta och i anslutning härtill utnyttjande av blastdödande medel. [**The control of leaf blight and brown rot of potatoes and its relation to the use of defoliating chemicals.**] *Nord. Jordbrforskn.* 1951, **31/32,** 393-9, bibl. 9.

summarized account is given of research and xperiences in Sweden with Cu-preparations for he control of leaf blight (*Phytophthora infestans*) nd brown rot (*Bacterium solanacearum*) and the se of different methods of defoliating potato rops.—P.J.B.

63 Montaldo, A. and Rojas Peña, E. de. Fitomejoramiento para resistencia al tizon de la papa. [**Improvement of potatoes for resistance to *Phytophthora infestans*.**] *Agric. Tec., Chile* 1950, **10**, 66-73, bibl. 2, English summary pp. 72-3. [A.M., Dept Invest. Agric., Minist. Agric., Chile and E. de R. P., Esta. Exptl de Papas de Usme, Minist. Agric., Colombia]

ild and cultivated species of Chilean potatoes ere tested and found susceptible to *Phytophthora nfestans*. A list is given of breeding matrial at the Estacion Experimental Centinel de uerto Octay, Caledonia, consisting of crosses etween *Solanum demissum* × *S. andigenum* and *S. tuberosum* × *S. demissum*, which show promise of resistance to *Phytophthora infestans*.—N.G.S.

864 Campbell, J. C. and Pepper, B. B. **Some observations on effects of wettable DDT and emulsifiable DDT on potato quality and blight control.** *Amer. Potato J.* 1951, **28**, 638-40. [Rutgers Univ. Agric. Expt Sta., New Brunswick, N.J.]

A spraying experiment conducted with the potato variety Katahdin at Deans, New Jersey, in 1950, to determine the effect on tuber flavour of 5 DDT emulsions (each made from a different solvent), a wettable DDT powder, calcium arsenate + basic copper, and wettable DDT + basic copper, indicated that some solvents used in DDT emulsions might, under certain conditions, cause off-flavours in potatoes sprayed with these materials. Late blight was observed on approximately 75% of the leaves of those plants sprayed with DDT emulsions, adjacent plants sprayed with wettable DDT powder showed less than 5% of affected leaves, while plants sprayed with 4 lb. basic copper + wettable DDT throughout the season had less than 1% blight. No explanation was found for these differences in blight control.—E.B.O.

865 Wilson, J. D. and Sleesman, J. P. **Disease and insect control on potatoes in Ohio in 1950.** *Amer. Potato J.* 1951, **28,** 632-8. [Ohio Agric. Expt Sta., Wooster]

The zinc ethylene bis dithiocarbamate formulations, Dithane and Parzate, under the conditions of these experiments, gave better control of early and late blights, and so higher yields, than did most of the copper-containing fungicides. The zinc dimethyl dithiocarbamate formulations, Zerlate, Methasan and Zac, gave fair control of early blight but were comparatively ineffective against late blight. In the presence of late blight, the copper-containing materials gave better results than the zinc dimethyl dithiocarbamates, even though they did fall a little short of the results given by Dithane and Parzate. A variety of fungicides and insecticides applied to potatoes in the "4X" concentration (one-fourth the usual amount of water) at the rate of 40 gal. per acre and at 80 lb. pressure gave good control of diseases and insects. This suggests that sprays more concentrated than those commonly used may come to be used on row crops, when certain mechanical difficulties have been overcome. One lb. of actual DDT per acre, applied at each application at 10-day intervals, gave good control of flea beetles, leafhoppers and Colorado potato beetles. Parathion gave excellent control of both aphids and whiteflies.—From authors' summary.

866 Agricultural Gazette of New South Wales. **The potato moth** (***Gnorimoschema operculella***). *Agric. Gaz. N. S. W.* 1951, **62**, 664-7.

The control measures recommended for this pest include: (1) spraying or dusting the foliage in the field with 1 lb./ac. of active (para para isomer) DDT; (2) hilling the plants with a disc hiller, fairly late in the growing season, but before the foliage dies off; (3) the adoption of a crop rotation, so that potatoes are grown on the same land not more than once every 5 or 6 years; (4) clean cultivation and harvesting methods; (5) protection of seed potatoes in storage by dusting with a 2% DDT dust at the rate of 0.75 lb. per bag [weight not given]; (6) protection of table potatoes by derris dust [rates not given] or by fumigation for 48 hr. with carbon bisulphide, using 2 lb. (24 fluid oz.) to every 1000 cu. ft. of air space in the container.—K.L.

867 Lloyd, G. W. **Insecticide tests against the potato tuberworm.** *J. econ. Entomol.* 1951, **44**, 613-14, bibl. 3. [Maryland Agric. Expt Sta.]

Three methods of controlling the tuberworm, *Gnorimoschema operculella*, in stored potatoes infested artificially, were attempted by using several insecticides: (a) dusting the potatoes; (b) spraying the internal walls of storage cardboard boxes; and (c) impregnating storage burlap bags with a solution of the insecticides. The insecticides DDT, Chlordane, Toxaphene and BHC were tested in each of the 3 methods and Pyrophyllite and Methoxychlor in the dusting method only. Results, which are tabulated, showed a varying degree of control.—E.B.O.

868 Mai, W. F. and others. **Yields of Green Mountain and Cobbler potato varieties grown on golden nematode infested soil.** *Amer. Potato J.* 1951, **28**, 617-25, bibl. 15. [U.S. Dept Agric., Beltsville, Md]

In a field of commercially grown potatoes, the yields of the late variety Green Mountain, and of the early variety Cobbler were found to be inversely related to the number of golden nematode, *Heterodera rostochiensis*, cysts found in the soil. The yield of the former variety was reduced more than the yield of the latter variety.—From authors' summary.

869 Gibson, K. E. and others. **Effect of aphid control on the spread of leafroll in potatoes.** *Amer. Potato J.* 1951, **28**, 658-66, bibl. 1, illus. [U.S. Dept Agric., Yakima, Wash.]

Ten insecticides were tested on Netted Gem potatoes to determine their relative value for controlling the aphids *Myzus persicae* and *Macrosiphum solanifolii* and, indirectly, for preventing the spread of potato leafroll. On potatoes planted for an early crop, dusts containing 4% DDT and 80% sulphur, 5% DDT and 75% sulphur, or 5% DDT only, all gave good control of aphids and the incidence of leafroll did not exceed 5.8%. On potatoes planted for a late crop, the insecticides tested were relatively ineffective for aphid control and the leafroll incidence was high. A dust containing 5% DDT and 75% sulphur gave the best control of aphids throughout the entire season with 43% incidence of leafroll. Dusts containing Parathion were relatively ineffective during the period of winged-aphid migration but gave good control after the migration had abated, with a leafroll incidence not exceeding 43%. DDT-sulphur and Parathion dusts were equally effective in preventing the spread of leafroll.—From authors' summary.

870 Chapman, H. W. **Absorption of CO_2 by leaves of the potato.** *Amer. Potato J.* 1951, **28**, 602-15, bibl. 13, illus. [Nebraska Univ., Lincoln]

The object of this study was to measure differences in apparent photosynthesis between leaves of the Triumph, Irish Cobbler, White Cloud and Progress potato varieties, and to determine the extent to which environmental and internal factors influence the natural variations in CO_2 absorption. It appeared that: (a) the CO_2 absorption method of measuring apparent photosynthesis was well adapted for use with potato leaves; (b) wilting of leaves caused a decrease, and effective rain an increase, in the rate of CO_2 absorption; (c) the highest rate of CO_2 absorption by Triumph leaves occurred between 80 and 90°F., under field conditions; (d) the highest rate of CO_2 absorption for all 4 varieties took place usually between 7 and 9 a.m., followed by a gradual decline throughout the remainder of the day; (e) there were great variations in the rate of CO_2 absorption with paired leaves on the same and different potato plants; (f) leaves located near the base of potato plants absorbed CO_2 only two-thirds as rapidly as the 3rd or 4th leaves below the terminal leaf cluster; (g) of the 4 varieties tested, Triumph had the lowest rate of CO_2 absorption per unit area of leaf surface.—E.B.O.

871 Brautlecht, C. A. and Getchell, A. S. **The chemical composition of white potatoes.** *Amer. Potato J.* 1951, **28**, 531-50, bibl. 54, illus. [Maine Univ., Orono]

The information collated was obtained from the literature on the subject and the authors' own investigations. The percentage of starch in white potatoes [*Solanum tuberosum*] varies, with the variety and the climatic and cultural conditions, from 9.6 in Earlaine No. 2 to 20.0 in the variety Green Mountain. Commercial samples of the variety Bliss showed a starch content as low as 8%. The average starch content of all Maine seed and table potatoes was about 12% in 1950. The present trend is apparently towards varieties of higher starch content. Nitrogenous compounds are present as proteins, intermediate hydrolysis products of proteins and amino acids. The non-starch carbohydrates (cellulose, pentozans, pectins, etc.) usually follow next in order of importance, but they may exceed the nitrogenous compounds. Then come the mineral compounds, especially potassium phosphate. Finally there are a large number of compounds such as the organic acids, ether extractives (fat and oil), and enzymes, which are present in very small quantities, and the vitamins which are present in traces. Analytical data showing the chemical composition of Maine-grown potatoes are tabulated.—E.B.O.

872 Noonan, J. C. and others. **Influence of location on the ascorbic acid content of the Irish potato.** *Amer. Potato J.* 1951, **28**, 521-4, bibl. 6. [Louisiana Agric. Expt Sta., Baton Rouge]

Five varieties of recently harvested potatoes, LaSoda, DeSoto, Katahdin, LaSalle and Triumph, from 5 locations in Louisiana, were analyzed in 1949 and 1950 for their ascorbic acid and dry-weight contents. It appeared that there were significant differences among locations in the amount of ascorbic acid content. The differences among the varieties themselves were not significant. The data for dry-weight content indicated that there were highly significant differences between the varieties, but still greater differences between the years and locations. No correlation was found between ascorbic acid and dry weight. When choosing a locality for growing potatoes, factors such as yield and disease, as well as the ascorbic acid content, should be considered.—From authors' summary.

873 Jaehnl, G. Die Wuchsstoffe in der Kartoffelknolle. (Eine Übersicht.) [**The growth substances in the potato tuber. (A review).**] *Veröff. Bundesanst. alp. Landw. Admont* 1951, No. 4, 1-11, bibl. 21, illus.

This review of the literature deals with: (a) the discovery of growth-promoting and growth-inhibiting substances in the potato tuber; (b) their distribution at different physiological stages of the tuber; (c) growth substance relations as a means of nfluencing germination; and (d) the rest period and sprouting as governed by growth substances.—G.M.R.

874 Rieman, G. H. and others. **Clonal variations in the Chippewa potato variety.** *Amer. Potato J.* 1951, **28**, 625-31, bibl. 11. [Wisconsin Univ., Madison]

A wide range of plant characters has been observed in the clonal selections of the Chippewa potato variety grown in commercial fields and tuber-unit seed plots in Northern Wisconsin during the past decade. These variations, which also affect yield, have been studied in the field and greenhouse. An attempt has been made to determine variants due to: (a) environmental factors such as climate, soil and cultural practices; (b) disease, especially under different conditions of growth; and (c) genetic origin. The yields of 16 Chippewa strains, grown during 3 consecutive years, were found to range from 392 to 577 bu. per acre.—E.B.O.

875 Hawkins, A. and others. **Extreme case of soil toxicity to potatoes on a formerly productive soil.** *Amer. Potato J.* 1951, **28**, 563-77, bibl. 10, illus. [Storrs Agric. Expt Sta., Conn.]

In the 13th consecutive year of growing potatoes, a formerly productive soil was found to be very unproductive, though liberally fertilized with a complete fertilizer containing sufficient water-soluble magnesium. The soil, a fine sandy-loam, was strongly acid. The potato plants were very small and spindly, their roots being short and stubby. The toxic effects of copper, manganese and aluminium were considered as direct causes of this trouble. Treatments that reduced the acidity of the soil were beneficial. Until this type of toxic condition can be reduced to a minimum by moderate liming and the ploughing in of considerable amounts of organic matter, the use of superphosphate applied in a 6 in. band on top of shallow-covered seed-pieces at planting time, can be used as an emergency treatment.—E.B.O.

876 Wilson, A. R. **Potato storage investigation.** Paper read in Section M (Agriculture) of the meeting of the British Association for the Advancement of Science, Edinburgh, 1951.

This paper gives some of the results obtained from investigations carried out under the Agricultural Research Council since 1947. The sub-division of surface potato stores into bins is considered impracticable in this country although, if required, this can be achieved by using straw-bale partitions. Again, loading to higher levels than 12 ft. above traffic level is not desirable so that the possibilities are thus reduced to shallow loading to heights not exceeding 6 ft. or high-loading to heights not exceeding 12 ft. Shallow storage is already being practised and investigations have therefore been concentrated on the problems of deep storage for mid-term (October-March) periods. The main difficulties in bulk storage up to the end of March are: to cool the potatoes, to prevent contact freezing at the walls, and to prevent excessive roof condensation. Satisfactory methods for overcoming these difficulties are outlined. Three methods of ventilating deep stores under commercial conditions were studied, namely, gravity, forced draught with manual control, and forced draught with thermostatic control. In the last method, the maximum temperature of the potatoes was consistently a few degrees below the corresponding temperatures in clamps and definitely below the ambient maximum. Shrinkage and losses were also reduced when using this method. Sprouting was markedly less in store than in clamp. Where the crops in a clamp are seriously affected with tuber blight (approaching 10%), secondary invasion of blighted tubers by bacteria may lead to overheating, deterioration of sound tubers and clamp collapse. However, during 1950/51, in 2 deep stores, tubers showing 11 and 13% blight infection, respectively, were, when examined in April, all in the dry-blight condition, no secondary bacterial infection had occurred and temperatures throughout storage had been normal. A satisfactory method of mechanized, continuous, longitudinal store-loading was developed and tested.—C.L.S.

877 Burton, W. G. **Factors influencing the distribution of temperatures in potatoes stored in bulk.** Paper read in Section M (Agriculture) of the British Association for the Advancement of Science, Edinburgh, 1951.

Provided that the outside temperature of stored potatoes remains fairly steady, the average temperatures of the potatoes will rise to a certain level above that of the outside air and not more. The magnitude of this temperature difference depends upon the dimensions of the stored mass and upon the storage temperature. The provision of ventilating ducts beneath the potatoes will lower both the average and maximum temperatures. Continuous forced ventilation is not practicable as not only would it cause excessive wilting, but, on occasions, it might warm the potatoes.—From summary.

878 Vanasse, N. A. and others. **Specific gravity-dry matter relationship in potatoes.** *Amer. Potato J.* 1951, **28**, 781-91, bibl. 5. [N. Carolina State Coll., Raleigh]

The specific gravity and dry matter content of potatoes grown at representative locations in N. Carolina were determined. There were significant differences in the specific gravity/dry-matter content relationships between different locations and varieties, though these differences did not greatly affect the prediction of dry-matter contents. A prediction equation and prediction error is given for the estimation of the dry-matter content of potatoes from their specific gravity values, irrespective of tuber size, variety or location under N. Carolina conditions.—From authors' summary.

879 Craft, C. C. and Heinze, P. H. **Association of specific gravity with weight of individual tubers in late crop potatoes.** *Amer. Potato J* 1951, **28**, 580-2, bibl. 4. [U. S. Dept Agric. Washington, D.C.]

Individual weights and specific gravity values were determined on more than 1400 tubers, representing 6 varieties and 17 lots of potatoes. Only 4 of the 17 lots gave statistically significant correlation coefficients for weight and specific gravity. In 2 o these lots, the larger potatoes tended to have a lower specific gravity than the smaller ones ; in the other 2 lots, the larger potatoes had a higher specific gravity than the smaller ones. These 4 lots represented 4 different varieties from widely scattered areas in the USA. No explanation of the relationship could be given on the basis of location size of tubers, or average specific gravity of the lot ; nor could any practical significance, as far as separating potatoes for specific gravity on the basis of weight, be found for any of the relationships.—E.B.O.

880 Kirkpatrick, Mary E. and others. **Flavou and odor of cooked potatoes as affected by use of Lindane and benzene hexachloride as insecticides.** *Amer. Potato J.* 1951, **28** 792-9, bibl. 16. [Entomol. and Plant Quarant. Bur., U. S. Dept Agric., Washington, D.C.]

Trials were carried out to determine the effect on potato flavour of growing potatoes in soil treated with 1 lb. per ac. of Lindane and 8 lb. per ac. of technical BHC during the previous year and the effect of 0.25, 1 and 4 lb. per ac. of Lindane applied immediately before planting. Both the two previous-year treatments impaired flavour, the BHC to a greater extent than the Lindane. In the case of the third trial, the 0.25 lb. per ac. Lindane treatment caused only slight off-flavour, while the 1 and 4 lb. treatments caused marked impairment of flavour.—P.J.B.

SWEET POTATO

881 Morimoto, H. and others. [**Studies on the two-sided utilization of crops as foods for men and animals. II. The sweet potato.**] [Japanese] *Bull. Nat. Inst. agric. Sci.* Ser. G. 1951, No. 2, 115-19, bibl. 5, English summary p. 119.

The yield and composition of sweet potato were studied every 10 days between 20 August and 17 November [year not stated]. The highest yield of both vine and tuber was obtained on 20 October, on which date the combined total nutrient value of vines and tubers also reached its maximum.—From authors' summary.

882 Calma, V. C. and Paningbatan, E. S. **Field test of six varieties of sweet potato.** *Philipp. Agriculturist* 1950, **34**, 84-9, bibl. 4. [Philipp. Univ. Coll. Agric., Agron. Dept]

Of the 6 varieties of sweet potato, *Ipomoea batatas*, studied, Segurado and Tamisang Puti were early and Samar Big Yellow, Sinawa, Kinalamyas and Pirurutung, late. When grown in the dry season, Samar Big Yellow was the most vigorous variety, followed by Sinawa. When grown in the wet season, Segurado and Tamisang Puti were the most vigorous, followed by Samar Big Yellow. Segurado and Tamisang Puti matured in the dry season in about 80 days, and in the wet season, in 95 to 100 days. Samar Big Yellow, Kinalamyas, Sinawa and Pirurutung matured in the dry season in 95 days, and in the wet season in 126 days. As to root yield, the varieties, grown in the dry season, were placed in the following order of descending yield: Segurado, Tamisang Puti, Samar Big Yellow, Kinalamyas, Sinawa and Pirurutung; in the wet season, the order was Tamisang Puti, Segurado, Kinalamyas, Pirurutung, Samar Big Yellow and Sinawa. All the varieties were attacked in varying degrees by the sweet potato root weevil, *Cylas formicarius*, Segurado having the highest number of infested roots in the dry season. All the varieties suffered practically the same low degree of infestation in the wet season.—From authors' summary.

YAM

883 Agronômico, Campinas. Cara. [**Yams.**] *Agronômico, Campinas* 1951, **3**, Nos. 27-8, 1—2.

Out of a collection of 80 varieties of yams (*Dioscorea* spp.) at the Instituto Agronômico, Campinas, São Paulo, Brazil, the variety 29-Florida is outstanding. It produces well-shaped, uniform tubers and is resistant to leaf-scorch (*Cercospora dioscoreae*).—N.G.S.

FIBRE CROPS

COTTON

884 Samuelides, S. J. Le coton en Grèce. [**Cotton in Greece.**] *Cot. Fib. trop.* 1951, **6**, 141-50, bibl. 19.

Information is given on the cotton species and varieties grown in Greece during the last 150 years and also on those varieties, such as Egyptian, which are thought to be suitable for cultivation in that country. There are tables giving the yield of several cotton varieties grown in Greece, with or without irrigation, in 1949 and 1950.—E.B.O.

885 Carvalho, M. de. Experimentaçao algodoeira em Moçambique. [**Cotton experiments in Mozambique.**] *Agronomia Lusitana* 1949, **11**, 249-375, English summary pp. 372-5.

Experiments on sowing date, varieties and spacing were carried out on 19 stations for 4 years. They were laid out in randomized blocks, each experiment being concerned with one factor only. The ecology of the more important cotton areas of Mozambique is described. The optimum sowing date for cotton was found to be determined by the onset of the wet season, and the conjunction of low temperatures with shortening daylight. Optimum rainfall was found to be 700 to 900 mm. with 75% of this in the 2nd to 4th month. Maximum yields were obtained from early sowing. Optimum sowing date was found to vary with latitude, being later in the north than in the south of Mozambique. The sowing period begins in the second half of November in the south and ends in the first half of January in the north. Sowing in March and April results in a continuous increase in red bollworm populations. Optimum sowing periods are given for the various districts of Mozambique. The variety 6250 yielded best in the lower areas north of the Save River, where there was no lack of moisture in the early stages. 9L36 and 9L18 proved better in the drier cotton areas. South of the Save River, the variety 5149 proved best. Optimum spacing was found to be 1 - 1.20 m. between rows with 0.3 - 0.5 m. between plants; the wider spacing being recommended where conditions are favourable to vegetative growth.—From author's summary.

886 Coton et Fibres Tropicales. Le coton au Pérou. [**Cotton in Peru.**] *Cot. Fib. trop.* 1951, **6**, 151-6.

Information is given on cotton cultivation in Peru, including area cultivated, regions of cultivation, annual production and varieties grown. Cotton is grown in Peru exclusively under irrigation. In 1948-9 the cotton area was about 150,000 ha. and the total production about 4,014,000 Peruvian q. of seed cotton, equal to about 1,461,000 q. of lint (1 Peruvian q. = 46 kg.). The varieties Tanguis and Pima yielded 99% of the total production.—E.B.O.

887 United States Department of Agriculture, Bureau of Agricultural Economics. Stat. Bull. No. 99. **Statistics on cotton and related data.** 1951, pp. 410.

The data are for the USA and include the acreage and production of cotton from 1790 to 1950 and the production of Upland, American-Egyptian and Sea Island cotton, cotton seed and linters from 1899 to 1949.—P.J.B.

888 Welch, C. D. and others. **Effects of winter cover crops on soil properties and yields in a cotton/corn and in a cotton/peanut rotation.** *Proc. Amer. Soc. Soil Sci.* 1950, **15**, 229-34, bibl. 6. [N. Carolina Agric. Expt Sta., Raleigh]

Studies were made of the effect of legume and non-legume cover crops. These included hairy vetch (*Vicia villosa*) and Austrian winter peas (*Pisum arvense*), in cotton/maize and cotton/groundnut rotations; oat/vetch mixtures and oats in the cotton/maize rotation; crimson clover (*Trifolium incarnatum*) and ryegrass (*Lolium multiflorum*) in the cotton/groundnut rotation; and hairy vetch alternated with continuous cotton. Two rates of N, 80 and 120 lb. per ac., were applied to the cotton and maize, the control plots being left untreated. After 5 years, the soil in the cotton/groundnut rotation was lower in exchangeable K and more acid than that under the cotton/maize rotation, mainly due to the complete removal of the groundnut tops whereas the above-ground parts of the maize plants in the maize/cotton rotation were returned to the soil. The return of maize crop residues also resulted in a greater degree of water infiltration in soils under the maize/cotton rotation than under the groundnut/cotton rotation. The soil of plots under rotations which included cover crops contained more exchangeable K than that under rotations having no cover crops. The hairy vetch and oats/vetch cover crops produced the highest amount of dry matter in the maize/cotton rotation, while under the groundnut/cotton rotation, crimson clover produced the highest dry matter yields, though where top-dressings of 54 lb. N per ac. were made to ryegrass, its dry matter yields equalled those of the clover. The yield of groundnuts was increased by the cover crops, the legumes being more effective than non-legumes. The highest seed cotton yields were obtained from the maize/cotton rotation which had received 120 lb. per ac. of N. The application of 80 lb. N per ac. to maize, following the ploughing under of the legume cover crops gave the best results in terms of economy and yield; where non-legume cover crops were used, 120 lb. N per ac. gave the highest yields.—P.J.B.

889 PETERS, R. W. **The cotton varietal position in Queensland.** *Qd agric. J.* 1951, **73**, 187-96.

After describing the breeding and harvesting problems of cotton (*Gossypium hirsutum*) in Queensland, a description is given of the four main commercial varieties grown there: Miller, New Mexico Acala, Lonestar, and Triumph.—K.L.

890 KAMEL, M. **Studies on the development of the boll, and the formation of oil in the developing seed in some varieties of Egyptian cotton.** *Nature, Lond.* 1951, **167**, 357. [Dept Agric. Bot., Fouad I Univ., Cairo]

Development of the boll was investigated in the varieties Ashmouni, Sakel, Wafir and Maarad. Ashmouni and Maarad were selected also for the determination of oil in the developing seed. Formation of oil in the seed was not related to growth of the boll (in size or green weight) or its contents.—M.H.

891 UNITED STATES Department of Agriculture, Production and Marketing Administration, Cotton Branch. Agric. Inform. Bull. No. 39. **The grading of cottonseed.** By *M. E. Whitten.* 1951, pp. 66.

892 CABRAL, A. O "willt" na província do Sul do Save. [**Cotton wilt: the province of Sul do Save Mozambique**).] *Agronomia Lusitana* 1951, **13**, 13-18, illus., English summary p. 18.

Cotton wilt, caused by *Verticillium dahliae*, attacked cotton in Mozambique for the first time in 1949. Methods of control are enumerated.—N.G.S.

893 SMITH, W. R. and CALHOUN, S. L. **Spraying for early-season control of boll weevil.** *J. econ. Entomol.* 1951, **44**, 919-20, bibl. 4. [Entomol. and Plant Quarant. Bur., U.S. Dept Agric.]

In trials carried out on south Mississippi Delta plantations, 14 gal. of emulsion containing 0.8 lb. Toxaphene per ac. were applied as a spray during cotton cultivation. Treatment was begun when the oldest squares were slightly less than half-grown. The results indicated that pre-bloom and early-bloom spray treatments could be efficiently made to cotton at the same time as the normal cultivations and that the date at which 25% of the squares became infested was delayed by up to 3 weeks by the treatments. On an average, 6.5 applications of Toxaphene were made to each field treated. Although weather conditions reduced the effectiveness of treatment, significant yield increases followed treatment on 6 out of 9 fields, compared with untreated controls.—P.J.B.

894 RAINWATER, C. F. and GAINES, J. C. **Seasonal decline in the effectiveness of certain insecticides against boll weevil.** *J. econ. Entomol.* 1951, **44**, 971-4, bibl. 4. [Texas Agric. Expt Sta., College Station]

In field cage tests over a 3-year period, results showed that certain insecticides were less effective against cotton boll weevil (*Anthonomus grandis*) late in the season, than early in the season. Toxaphene, BHC, Aldrin and Dieldrin were approximately 50% as effective against boll weevil in October, as in July. Tests showed that 240 times as much Toxaphene was required to kill the same number of boll weevils in October as in July. In trials to determine the residual toxicity of different insecticides, Aldrin and BHC lost more than 50% of their effectiveness and Heptachlor, Dieldrin and Toxaphene lost 39, 32 and 45%, respectively, of their effectiveness within 1 day of application. Calcium arsenate lost no effectiveness after 1 day

nd EPN (a product containing 27% of O-ethyl
)-p-nitrophenyl benzene thiophosphonate) lost
nly 2%.—From authors' summary.

95 GAINES, J. C. and MISTRIC, W. J. **Effect of rainfall and other factors on the toxicity of certain insecticides.** *J. econ. Entomol.* 1951, **44**, 580-5, bibl. 3. [Texas Agric. Expt Sta.]

aboratory, greenhouse and field trials were carried
ut during 1950 to study the effect of rainfall and
ther environmental factors on the toxicity of both
pray and dust preparations of several organic
nsecticides employed for controlling the boll
veevil, *Anthonomus grandis* and leaf-worm, *Alabama*
rgillacea, on cotton. The spray preparations
roved generally more effective than the dusts. To
ontrol boll weevil it was necessary to employ
onsiderably higher doses of the insecticides in the
eld than in the laboratory or in the greenhouse,
nd higher doses in late September and October
han in August. It appears that, besides environ-
nental factors, there are other factors probably
nvolving the physiology of the weevil, which in-
uence the dose of insecticide required to kill the
est. Although the application of 0.5 in. of simu-
ited rain reduced in most cases the toxicity of the
pray preparations in the laboratory, it is thought
hat the high amounts of insecticides which are
enerally used in field applications would probably
emain effective for leaf-worm control following at
east 0.5 in. or more of rain.—E.B.

96 ROUSSEL, J. S. and others. **The effect of infestation by the spider mite *Septanychus tumidus* on growth and yield of cotton.** *J. econ. Entomol.* 1951, **44**, 523-7, bibl. 9. [Louisiana Agric. Expt Sta., Louisiana State Univ.]

n a small field plot test, conducted at Baton
ouge, Louisiana, during 1950, injury to cotton
esulting from infestation by *S. tumidus*, caused a
5% reduction in the amount of seed cotton pro-
uced. This injury reduced vegetative growth as
easured by the amount of dry matter produced,
umber of leaves per plant and size of leaves.
everal characters of the seed and lint were ad-
ersely affected. In the bolls, which developed at
e first node of the seventh fruiting branch, there
ere reductions in the average number of seeds per
oll and in the weight, viability and the oil content
f the seeds. There was little effect on lint per-
entage, but when the lint index was used as a
iterion of lint production there was a sharp
ecrease. There was also a reduction in length and
aturity of fibres.—From authors' summary.

)7 HALL, V. L. **Biochemical composition of cotton leaves and their chemical defoliation as affected by environment.** *Plant Physiol.* 1951, **26**, 677-86, bibl. 13, illus. [Univ. Calif., Davis]

Induced defoliation of cotton became necessary with the perfection of the mechanical cotton picker. Earlier trials had shown that the physiological condition of the leaf, at the time the defoliant is applied, is the determining factor in causing abscission. The results are given of a factorial experiment carried out, under greenhouse conditions, to determine the influence of variation in number of bolls per plant, moisture availability, and nutrient supply upon defoliation. Two defoliants were used: (a) a 2% suspension of Aero Defoliant (60% calcium cyanamide), followed by 6 hr. of simulated dew; and (b) a 1.88% solution of a liquid defoliant (20% free cyanamide) after which the plants were maintained in a relatively dry atmosphere. Each defoliant was applied to plants in two of four randomized blocks. A difference in effectiveness between the two types of defoliant was not established. The effectiveness of the defoliant is largely conditioned by the status of the plant, as a result of variations in number of bolls per plant, moisture supply and nutrient supply. There is a high degree of negative covariance between sensitivity to defoliation and the starch content of the leaves. This suggests that carbohydrate depletion is an important factor in the effectiveness of chemical defoliation. "The study has revealed that it may be possible to predict, with fair accuracy, the susceptibility of a cotton field to chemical defoliation by making an assay of the starch content of the plants."—D.B.

898 ERGLE, D. R. and EATON, F. M. **Sulphur nutrition of cotton.** *Plant Physiol.* 1951, **26**, 639-54, bibl. 18, illus. [Div. Cott. and Other Fibre Crops and Dis., U.S. Dept Agric.; and Texas Agric. Expt Sta., College Station]

This investigation on cotton was of a similar pattern to those done on soyabean, sunflower, and black mustard [*Herb. Abstr.* 5: 109a; and 13: 889 and 1748]. Cotton plants were grown in nutrient solutions containing 0.1, 1, 10, 50 and 200 ppm of sulphate ion. Plants grown in solutions low in sulphur had chlorotic leaves, which were also reduced in size while their stem elongation was retarded. Of the carbohydrates, reducing sugars and sucrose were considerably decreased in amount, starch less so, and hemicellulose not at all. Of the nitrogen compounds, sulphur deficiency greatly decreased the amount of protein in the leaves and increased it in the stems; nitrates and soluble organic nitrogen compounds accumulated, the increase in the latter being of the same order as the decrease in sugars. Of the mineral elements, there were extra accumulations of phosphorus, calcium and magnesium while there was little change in the amounts of iron and potassium. There was no difference in the effect of sulphur on the vegetative and reproductive activities of the cotton plant. Both increased proportionately with increasing sulphur supply. For purposes of comparison, the information obtained by S. V. Eaton on soyabean, sunflower, black mustard and tomato, has been tabulated along with that obtained by the authors for cotton. Of the five crops, the greatest growth depression from lack of sulphur was shown by cotton. " It seems probable that the sulphur requirement of cotton is especially high."—D.B.

899 SMITH, H. P. **Progress in the mechanized production and harvesting of cotton in America.** *Emp. Cott. Gr. Rev.* 1952, **29**, 12-20, illus.

The main factors involved in the mechanized production and harvesting of cotton in America are defoliation prior to machine harvesting, varietal characteristics, machine performance and the cleaning and ginning of the harvested cotton.—K.L.

900 RIGNEY, J. A. and NELSON, W. L. **Some factors affecting the accuracy of sampling cotton for fiber determinations.** *Agron. J.* 1951, **43**, 531-5, bibl. 4. [N. Carolina Agric. Expt Sta., Raleigh]

Studies were made of the errors associated with the sampling of plots within a replication, stratified versus random sampling of bolls on plants, subsampling lint at the gin, and other errors associated with drawing lint samples from experimental plots and measuring fibre characteristics. On the basis of the results of these studies, the following sampling procedure is recommended : from each plot in the replications, select about 100 bolls taken from the upper one-third and the lower two-thirds of the plant in proportion to the yields of these strata. The samples from each stratum in the plots should be kept separate and separate laboratory determinations made on each. In deriving the average plot value, the values obtained from the different strata should be weighted by the estimated yield within the strata. Data are given of the observed range in treatment means and the sampling errors to be expected in the use of this sampling procedure. The data refer to mean length, upper-half mean, fineness and Pressley Index.—P.J.B.

OTHER

901 UNITED STATES Department of Agriculture. Circ. No. 854. **Some cultural experiments with kenaf** [*Hibiscus cannabinus*] **in Cuba.** By *J. E. Walker* and *M. Sierra.* 1950, pp. 24, bibl. 13.

Trials were carried out during 1946-47 to determine the effect of sowing date, row spacing, method and rate of sowing, and age at harvest on the fibre strength and seed yield of kenaf. In 1946, the highest fibre yield, 3603 lb. per ac., followed sowings made on 21 June with a harvest on 16 November. In 1947, sowings on 15 May produced 3296 lb. per ac. of fibre, but sowings on 27 June produced only slightly lower yields of 2956 lb. per ac. Fibre strength was not significantly affected by sowing dates, though the fibre of plants sown in May was strongest in both years. The optimum growth period ranged from 105 to 147 days, depending to some extent on climatic conditions. Fibre strength increased progressively as plants grew older, up to a maximum at between 105 and 126 days old. Varying plant spacing from 5 to 10 per foot of row had no significant effect on fibre yields. The fibre strength of plants spaced at 10 per foot of row was slightly, though significantly, higher than that of plants spaced at 5 per foot of row. 4 in. rows consistently produced higher fibre yields per ac. than did 8, or 16 in. rows, though the differences between the 4 and 8 in. rows were not significant. The effect of close row spacing was only apparent in the case of June, July and August sowings. The 8 and 16 in. rows produced fibre with the highest tensile strength, though this only held good for early sowings. Sowing rates of 20 and 30 lb. of seed per ac. resulted in higher fibre yields than rates of 40 to 60 lb. per ac. There were no significant differences between the yields of plants from broadcast, or drilled seed. In seed production trials, sowing broadcast at 20 lb. per ac. resulted in the highest seed yields—P.J.B.

902 HAARER, A. E. **Some observations on the cultivation of kenaf** [*Hibiscus cannabinus*] *Econ. Bot.* 1952, **6**, 18-22, bibl. 7.

A critical review is given of the objectives of research on kenaf. The implications of the photoperiodic response of kenaf strains from different parts of the world and from different regions of Africa are discussed in relation to spacing out the time of harvest.—P.J.B.

903 HAARER, A. E. **A soft-fibre substitute for jute.** *New Commonw.* 1952, **23**, 64-7, illus.

The three best jute-substitute fibres are obtained from *Hibiscus cannabinus*, *H. sabdariffa* var *altissima* (Roselle) and *Urena lobata* (Aramina fibre). The first of these is now widely preferred because it is less exacting as regards soil and environment, and it outyields the other two. It ha provided the fibre known as Bimlipatam jute in Madras and is also known under the names o Deccan or Ambari hemp, Mesta pat, Wilde stokroos, Rama, Bimlijute and kenaf. Bimlijut originated in Africa where it grows wild at al latitudes, attaining a height of 5 to 10 ft. Extension of the crop awaits the development of mechanized means for harvesting the plant and extracting its fibre —C.L.S.

OIL CROPS

SESAME

904 LAVRONOV, G. A. [**The cultivation of *Sesamum indicum* on the unirrigated soils of Uzbekistan.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 11, 59-61. [Miljutinskaja Sta. Breed. Sta.]

On progressive collective farms, sesame sown on unirrigated land gives seed yields of 1.5 to 2 ctr/ha. even in the absence of rain, while in years when weather conditions are more favourable, seed yields of 3 to 4 ctr/ha. and more are attained. It is particularly suitable for cultivation before wheat. Sesame is sown at a depth of 5 to 6 cm. in drills 60 to 70 cm. apart, the seed-rate being 4 to 4.5 kg./ha. The best yields are obtained when the area of nutrition is from 40 × 80 cm. to 70 × 80 cm., i.e. not more than 2 to 4 plants per sq.m. The best time for sowing in the Samarkand province is from 10 to 20 May.—R.P.J.

905 KRISHNAMURTI, SHRI, T. S. **Improved varieties of oilseeds—sesamum.** *Indian Fmg* 1951, **1**, No. 9, 22-3.

Available particulars regarding improved strains of sesamum evolved in different Indian states are given in tabular form. Reference is made in the text to trials of the progeny of hybrids between the cultivated sesamum (*S. orientale*) and a related wild Indian species (*S. prostratum*).—C.L.S.

LINSEED

906 GROSS, F. C. **Linseed—a useful crop for South Australia.** *J. Dep. Agric. S. Aust.* 1951, **55**, 198-203.

The article deals with the climatic and soil requirements of linseed, its place in crop rotation, seeding, manuring, harvesting, insect pests and diseases. It is a suitable rotation crop for areas of S. Australia where rainfall exceeds 17 in. The rust-resistant variety Walsh is the only suitable variety available to growers. Yields from 8 to over 20 bu. per ac. have been obtained. The crop can be grown successfully under irrigation.—K.L.

907 BLACKMAN, G. E. and BUNTING, E. S. **Studies in oil-seed crops. I. Factors controlling seed production in linseed (*Linum usitatissimum*).** *J. agric. Sci.* 1951, **41**, 256-70, bibl. 25. [Dept Agric., Univ. Oxford]

During the years 1941 and 1946, 25 field experiments were carried out at various centres in England to assess the factors which determine the yield level and seed composition of linseed (oil flax). The experiments were of multifactorial design, and the main variables studied were varietal differences, levels of mineral nutrient supply and plant population. Additions of nitrogen (35 lb./ac.) over all experiments raised the yield of seed by 10%, whereas additional phosphorus (50 lb. P_2O_5/ac.) or potassium (80 lb. K_2O/ac.) had small and inconsistent effects. A significant interaction between nitrogen and variety was recorded in one trial. While the oil content of the seed was slightly depressed by additional nitrogen, the protein content was increased by a small amount. The effects of phosphorus and potassium were more variable; there was a trend for phosphorus to diminish the percentage of oil and for potassium to decrease the protein. Significant interactions for nitrogen and potassium, both in relation to oil and protein contents, were obtained in some experiments. No significant interactions between nutrient level and plant density were recorded. With a change in seed rate from 40 to 80 lb./ac., the yield was raised, but with higher rates there was no further commensurate rise. At the higher plant densities the yield in some trials was greater when the seed was drilled in narrow rows (4 in. apart). Later experiments involving comparisons of drilling one way and cross-drilling did not fully confirm the importance of spatial arrangement at a given density. Varietal differences in seed production or seed composition were independent of variations in density. Royal was the most productive of the ten varieties tested, yielding 25% more than La Plata. Bison was only slightly inferior to Royal, while Redwing, the earliest and the most even-ripening variety, produced a little more than La Plata. The oil content of Royal, Bison and La Plata averaged 40-42%, while the small-seeded varieties Redwing and Buda contained 38-40%. Bison tended to contain the most protein, while Royal and La Plata were equal in protein content. On the basis of these results, it is concluded that, compared with conditions in the main producing areas of the world, the environment of England is particularly favourable for a high level of seed and oil production.—From authors' summary.

908 FLOR, H. H. **Flax [linseed] variety mixtures.** *Bi-monthly Bull. N. Dakota* 1951, **13**, 191-4. [N. Dakota Agric. Expt Sta., Fargo]

Trials were started in 1947 at Fargo, N. Dakota, to compare the oil-seed yield of each of the following: an early variety Sheyenne, a mid-season variety Dakota and a late variety B5128, with that of mixtures of any two, or all three varieties. All the varieties were resistant to the races of flax rust found in N. Dakota in 1947 and 1948, but in 1949 all varieties were heavily rusted and their yields reduced. In only one out of 53 tests did a mixture yield as highly as did the highest yielding variety. Of varieties sown before 15 May, B5128 gave the highest average yield with 19.1 bu. per ac. and

Sheyenne the lowest, with 15.8 bu. per ac. For 9 sowings made after 15 May, Sheyenne was the highest yielding, with 12.3 bu. per ac., and B5128 the lowest, with 8 bu. per ac. The average yield of B5128 was 1 to 2.2 bu. per ac. higher than that of the mixtures in the early sowings while that of Sheyenne was 1.3 to 3 bu. per ac. higher than that of the mixtures in the late sowings.—P.J.B.

SUNFLOWER

909 Putt, E. D. and Fehr, J. A. **Effect of plant spacings, row spacings and number of plants per hill on Advance hybrid sunflower.** *Sci. Agric.* 1951, **31**, No. 11, 480-91. [Altona, Manitoba]

The yield, plant characters, bushel weight and per cent oil of the seed of Advance sunflower were determined for three seasons in a rate of seeding test consisting of 18- and 36-inch rows with plant spacings in the row of 6, 12 and 18 inches, and unthinned seeding rates of 5, 7.5 and 10 lb. per acre based on 36-inch rows. The results suggest that the Advance variety of sunflower can be grown successfully in row spacings as narrow as 18 inches, provided that plant spacing in the row is kept at 12 to 18 inches. In 36-inch rows, a plant spacing of 6 inches in the rows appears optimum ; satisfactory yields could also be obtained when the seed was sown at a rate of 7 to 9 per hill at 36 in. intervals, to permit of two-way cultivation for weed control. Percentage of oil in the seed, determined in the rate of seeding test only, showed a progressive increase as plant spacing decreased in the 36-inch rows, with the reverse occurring in the 18-inch rows.—C.L.S.

910 Mujica, R. F. Medidas adicionales de control de la esclerotiniosis del girasol. [**Additional measures for controlling *Sclerotinia sclerotiorum* on sunflower.**] *Agric. Tec., Chile* 1950, **10**, 74-8, bibl. 3, English summary p. 78. [Dept Invest. Agric., Minist. Agric., Chile]

Seed treatment with Aagrano, Ceresan and Meracet gave complete control of *Sclerotinia sclerotiorum* on sunflowers. Cultural methods of control are briefly described.—N.G.S.

911 Ustinova, E. I. and Nesterova, T. T. [**Development of the embryo in sunflower (*Helianthus annuus*) after different methods of pollination.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1951, **16**, No. 11, 14-22. [Moscow State Univ.]

The sunflower variety Saratovskiĭ 169 was chosen as the female parent and the varieties Černjanka 35 and Saratovskiĭ 169 were used as pollinators. Emasculation and pollination were carried out from 4 to 8 August. The following pollination methods were tested : 1. pollination with a large quantity of mixed pollen of the varieties Černjanka 35 and Saratovskiĭ 169 ; 2. pollination with a large quantity of its own pollen i.e. (Saratovskiĭ 169) ; 3. pollination with a small quantity of its own pollen ; 4. pollination within the capitulum. Development of the zygote and the formation of endosperm show clearly the greater efficiency of pollination with a mixture of pollen compared with the other methods used. After pollination with a small quantity of pollen, development proceeds more slowly than after using a large quantity. Self-pollination leads to gradual decay of the elements in the embryo sac of the ovule as a result of absence of fertilization. —R.P.J.

RAPE

912 Cambridge, National Institute of Agricultural Botany. **Seed Notes No. 41.** February, 1952, pp. 8.

Included in these notes is information on some recently imported oil-seed rape varieties. These rapes are either swede-like or turnip-like and are of winter or spring types. The spring types are annuals and begin flowering so early as to be useless for fodder. Although no trials have been carried out at the National Institute of Agricultural Botany to compare the winter types of rape with well-known English types, it appears that these imported winter rapes are suitable for fodder. The oil-seed rapes which have been grown at Cambridge include the following : (1) Winter types : (a) Swede-like ; Svalof Matador, Svalof Senraps, Svalof Tenus and Lambke's Winter rape ; (b) Turnip-like ; Svalof Rapido and Lambke's Winter Turnip rape. (2) Spring types (unsuitable for fodder purposes) : (a) Swede-like ; Regina, Liho and Black Argentine ; (b) Turnip-like ; Controlee, Clairvaux, Sweet German and Nida.—K.L.

913 Gisiger, L. Anbau- und Düngungsversuche mit Winterraps. [**Cultivation and manuring trials with winter rape.**] *Landw. Jb. Schw.* 1951, **65**, 652-67. [Eidg. Agrikchem. Anstalt, Liebefeld Bern]

Rape cultivation was introduced into Switzerland during the 1939-45 war to supply edible oils. Since it was a new crop to the country it was subjected to field trials, some of the more important findings from which are reported in this article. Harrowing and thinning are not necessary if the seed is sown at 8 to 10 kg./ha. Dense stands give higher yields than widely spaced plants. Application of nitrogen manure early in spring gives better results than does later application at onset of flowering. The latter practice depresses the oil content of the seed. Rape cannot be grown on a strongly acid soil unless this is well limed, but if good yields are to be obtained borax must also be added. It was found that boron deficiency reduces winterhardiness. Rape seeds increase in weight considerably during the last few days of maturity. It is therefore advantageous to delay harvesting until the crop is fully ripe, but not overripe, otherwise there may be a loss in yield owing to the bursting of pods.—D.B.

914 VALLE, O. Höstrybsen, Finlands värdefullaste näringsoljeväxt. [**Winter rybs, Finland's most valuable edible oil crop.**] *Tidskr. Lantm.* 1951, **33**, 60-3.

Practical recommendations are given for the cultivation of winter rape for seed oil under conditions in Finland. In sowing-date trials during 1948-50 at Dickursby, the respective average seed yields for sowings made on 20 July and 20 August were 2250 and 1330 kg. per ha. and oil yields 896 and 546 kg. per ha. In manurial trials, spring applications of 400 kg. per ha. of nitrochalk gave average seed, oil and crude-protein yields of 2860, 1209 and 599 kg. per ha., compared with 2190, 973 and 429 kg. per ha., respectively, where no N was applied. The German variety Gruber owing to its stronger stalk appears to be better suited than the Swedish Rapido where heavy applications of N are made.—P.J.B.

915 BONNEMAISON,—Protection des crucifères oléagineuses contre les méligèthes. [**Protection of oil-bearing crucifers against *Meligethes* spp.**] *C. R. Acad. Agric. Fr.* 1951, **37**, 441-4, bibl. 3. [Sta. Cent. Zool. Agric.]

A small quantity of an insecticide is effective against this pest if an appliance is used which spreads the chemical evenly over the crop. Experiments were carried out on colza. When applied as a powder, HCH (8% of active substance of which 13.8% was the gamma isomer), Chlordane (5% active substance) and diethyl and paranitrophenylthiophosphate caused a mortality amongst *Meligethes* spp. of 87 to 98% within 48 hours, and 100% within 72 hours. Treatment against *Meligethes* spp. is usually carried out at the end of March or beginning of April.—D.B.

OTHER

916 PEARMAN, R. W. and others. **Niger seed from Tanganyika.** *Col. Plant Anim. Prod.* 1951, **2**, 101-5.

A report is given on 3 samples of Niger seed received from Tanganyika in 1951. Niger seed, derived from *Guizotia abyssinica* an annual plant indigenous to tropical Africa, is cultivated fairly generally in E. Africa for local use and is grown on a large scale in India. The best qualities of Niger seed oil can be used for edible purposes.—C.L.S.

LAND USE, SURVEYS AND MANAGEMENT

917 WEST AUSTRALIA, University of. Res. Rep. No. 25. **Land utilization in the Southern Cross-Bullfinch district of W.A.** By *F. J. Johnson.* 1951, pp. 15, bibl. 6.

A general description of the district is given, together with an account of its economic development. Reference is made to the wheat industry in the area.—K.L.

918 STEDEN, A. Die landwirtschaftlichen Betriebsformen der Bundesländer Burgenland, Steiermark und Kärnten. [**Patterns of agriculture in the Provinces of Burgenland, Steiermark and Kärnten.**] *Bodenkultur* 1950, **4**, 486-510. [Hochsch. Bodenkultur, Wien, Austria]

The paper consists mainly of several pages of statistics giving the areas devoted to various types of farming, forestry and vineyards in the rural districts within the provinces named above. [From *Herb. Abstr.*]—D.B.

919 STEDEN, A. Die landwirtschaftlichen Betriebsformen der Bundesländer Oberösterreich, Salzburg, Tirol und Vorarlberg. [**Patterns of agriculture in the provinces of Oberösterreich, Salzburg, Tirol and Vorarlberg.**] *Bodenkultur* 1951, **5**, 17-36. [Hochsch. Bodenkultur, Wien, Austria]

The paper consists of tables giving the areas under various types of farming in the provinces named in the title. [From *Herb. Abstr.*]—D.B.

920 ENGLEDOW, F. **Agriculture in Southern Rhodesia.** *Emp. Cott. Gr. Rev.* 1952, **29**, 1-11.

The author discusses climate, soil erosion, the farming prospect, arable and mixed farming, ranching, cattle breeding, irrigation and the cotton crop. For all parts of Southern Rhodesia having soil and rainfall suitable for crop growing, progress depends on discovering farming systems soundly adapted to local conditions. Although the cotton crop is a valuable component of the farming system in areas with suitable soil and climate, further field trials are necessary before the true value of the crop can be assessed.—K.L.

921 CERRINA FERONI, F. L'agricoltura nel Madagascar. Caratteristiche e possibilità attuali delle colture e degli allevamenti. [**Agriculture in Madagascar. Characteristics**

and present possibilities of cropping and stock rearing.] *Riv. Agric. subtrop. e trop.* 1951, **45**, 245-67, English summary p. 267.

922 UNITED STATES Department of Agriculture. Agric. Inform. Bull. No. 30. **Guide to agriculture** [**in**] **U.S.A.** By *A. F. Raper* and *Martha J. Raper.* [n.d.], pp. 82.

This publication is intended to provide an introduction to agriculture in the USA. It is extensively illustrated and includes a considerable amount of information on the agricultural regions of the USA and the distribution and production of different crops.—P.J.B.

923 COOPER, H. P. **Recent significant developments in south-eastern agriculture.** *Agron. J.* 1951, **43**, 459-68. [S. Carolina Agric. Expt Sta., Clemson]

A review is given of changes in land-use patterns in the south-eastern States of the USA and the factors which dictate the various types of agriculture practised there. A table is given of the average chemical composition of crop plants grown under comparable conditions, with the metallic nutrients arranged in order of relative ion strength. The nutrient requirements of crops in relation to the soil characteristics of the south-eastern States is discussed, with particular reference to the respective role and place of Si- and Ca-accumulating plants. The present trend in south-eastern agriculture appears to be towards greater mechanization and greater efficiency of labour following reductions in the pressure of the agricultural population through increased urbanization and the shift of industry to the South. It is held that conditions in the south-eastern States provide excellent opportunities for the development of grassland enterprises, and thus a more satisfactory land-use pattern.—P.J.B.

924 DAZA, R. P. Porvenir agropecuarrio del Atlantico. [**Agricultural future of Atlantico.**] *Agron. trop.* 1951, **7**, No. 11, 43-9, map 1.

A brief report is given on a survey of the soils of the Departamento of Atlantico, in Colombia. Various crops are recommended for growing on the different soils. The article is illustrated with a map [almost indecipherable].—N.G.S.

925 WASHINGTON, Food and Agriculture Organization of the United Nations. **Yearbook of Food and Agriculture statistics, 1950, Vol. 4, Pt. I. Production.** pp. 367, Washington, 1950. [Received 1951]

Data are given on the population and agricultural areas of different countries and on the area, yield and total production of different crops in the countries where they are grown.—P.J.B.

926 ROME, Food and Agriculture Organization of the United Nations. **The state of food and agriculture : Review and outlook in 1951.** C51/20. pp. 90, Rome, 1951.

FARMING SYSTEMS AND PRACTICES

927 STAPLES, R. R. and MURRAY, C. A. **Farming systems in Southern Rhodesia.** *Rhod. agric. J.* 1951, **48**, 413-27, maps.

The authors outline, in a broad way and on a provisional basis, the systems of farming best suited, under present conditions, to the ecological areas (natural regions) of the Colony.—K.L.

928 SUDAN GOVERNMENT, Ministry of Agriculture. Bull. No. 2. **A note on the agriculture of the Azande.** By *A. G. McCall.* [n.d.], pp. 18.

The article is an account of the author's impressions of agriculture in the area before the Zande Scheme (see *Fld Crop Abstr.* 3 : 1049] came into being. The appendices include a list of crops, vegetables and trees from which food is derived by the Azande people, and a supplementary note is given on the effect of certain innovations on the agriculture of the area covered by the Zande scheme. The four innovations discussed are : (a) the establishment of individual holdings ; (b) the introduction of cotton and other cash crops ; (c) the marking out of standard plots for cash crops and (d) the change-over from a diet of eleusine flour to cassava flour.—K.L.

929 KENTUCKY Agricultural Experiment Station. Bull. 561. **Effects of certain cropping and management practices on soil nitrogen content.** By *P. E. Karraker.* 1951, pp. 10.

Over a 19-year period, the soil of plots under a maize/wheat/soyabean rotation in which the soyabeans were taken for hay, declined in N content by an average of 323 lb. per ac. Where the soyabeans were harvested for grain and the haulms returned to the soil, the N status of the soil remained constant. The N content of the soil of plots under a maize/wheat/red clover rotation in which the clover was taken for hay increased by an average of 296 lb. per ac. On silt loam soil, timothy (*Phleum pratense*) and different legumes were compared as the 3rd-year crop in maize/wheat rotations with different manurial treatments over a 15-year period. Under nost treatments, the soil N content did not change significantly. There was an average soil N content reduction of 150 lb. per ac. where soyabeans and cowpea (*Vigna sinensis*) were grown for hay and the plots received P, but no Ca; also, maize yields were low on these plots. The highest increase in soil N content occurred where dung was applied to the naize crop at the rate of 3 tons for every 1 ton of lover hay removed during the previous year.—P.J.B.

30 TEXAS Agricultural Experiment Station. Bull. 731. **Hairy vetch, bur clover and oats as soil-building crops for cotton and corn in Texas.** By *E. B. Reynolds* and others. 1950, pp. 23, bibl. 10.

Trials have been carried out over a period of 11 ears at 3 locations in Texas to determine the value f hairy vetch (*Vicia villosa*) as a soil-improving rop for maize and cotton. On Lufkin fine sandy-oam, ploughing in vetch resulted in cotton yields s high as those from fields where 500 lb. per ac. of -8-4 (NPK) had been applied. There were no yield esponses in cotton to N, following the ploughing in f vetch. P and K were essential to the vetch for atisfactory yields. In trials with different methods f establishing vetch on poorly-drained soils, idging, either before, or after sowing, gave the est results. Ploughing in vetch raised cotton yields nore than did ploughing in oats, or giant bur clover *Medicago* spp.). Vetch also had an appreciable esidual effect during the second and third year fter ploughing in.—From authors' summary.

31 BRAGE, B. L. and others. **Long-time effect of applying barnyard manure at varied rates on crop yield and some chemical constituents of the soil.** *Agron. J.* 1952, **44**, 17-20, bibl. 20. [Minnesota Agric. Expt Sta., St. Paul]

tudies were made of the crop yields in Minnesota fter a 30-year period under a 4-year rotation of 1 ear oats or barley, 2 years grass/legume hay and year of potatoes, rutabagas [swede turnips] or nflower, as affected by applications of 5, 10 and tons per ac. of dung applied to the grain stubble, 5 and 10 tons per ac. of dung applied to the hay op. Where dung was applied to the hay crop, ain, potato, rutabaga and sunflower yields were igher than where the dung was applied to the rain stubble, while hay yields were highest where e dung was applied to the grain stubble. Data are ven of the effect of these practices on the chemical nstitution of the soil.—P.J.B.

32 HILL, K. W. **Effects of forty years of cropping under irrigation.** *Sci. Agric.* 1951, **31**, 349-57, bibl. 3. [Field Husb. Div., Exptl Fm Serv., Ottawa]

10-year irrigated crop rotation, consisting of 6 ars of alfalfa followed by oats, barley, potatoes or gar-beet, and spring wheat, was laid down in 10 on 10 one-acre plots on typical southern Alberta silty, heavy loam soil. Until 1942, each plot received 12 tons farm-yard manure per acre during each 10 years; thereafter 30 tons were applied in 2 applications. From 1933 a predominantly phosphatic fertilizer was applied to half plots at the rate of 100 lb. per acre on 1st and 4th year alfalfa and on sugar-beet. Crop yields are presented as 5-year averages, and their trends show that farm-yard manure and phosphates are essential for yield maintenance, particularly with sugar-beet and alfalfa. The latter crop showed a downward yield trend without phosphate applications. Bacterial wilt and crown rot disease limited the economic life of alfalfa to 3-4 years. Soil nitrogen increased, but organic matter decreased; nevertheless, good soil structure has been maintained. [From *Herb. Abstr.*]—C.W.S.H.

933 JONES, E. **Can we learn from American farmers.?** *J. Fmrs' Cl., Lond.* 1951, Part 7, 99-104.

The author of this paper, read before the Farmers' Club, London, on 5 November, 1951, was a member of the Agricultural Team of the Anglo-American Productivity Council which visited the USA in the summer of 1951 to study farming methods in that country. The paper relates mainly to some of the features in American farming practices which contribute to the efficient use of labour and machines, and the generally higher output per man and per machine noted during a tour through the north-central and north-eastern States. As an example of this higher output, the author quotes the following comparative figures: the manual labour expended per acre of wheat in Britain is about 30 hours by binder or about 12 hours by combine harvester, whereas in the USA the figures are 11 hours by binder and about half that figure for combine harvester. Some of the principal factors contributing to the higher output per man and machine in the USA are: (a) better soil conditions; (b) mixed farming there is less complex and so reduces the range of machinery required; (c) crop rotations are simple, with silage taking the place of fodder roots; (d) field operations are greatly assisted by good layout of farms and the absence of permanent field boundaries which involve excessive maintenance work; (e) developments in the complete mechanization of hay harvesting, and the changeover from horse to power are more complete; (f) the design and layout of farm buildings, together with the fuller use of electricity; (g) the close link between the machinery manufacturer and the farmer, enabling new ideas and modifications of existing machines to be quickly incorporated in new machines; (h) American farmers are very adequately provided with advisory services, which are extremely practical and forthright in character. The management and economic organisation of farms occupies a very prominent place in advisory programmes.—A.G.G.H.

SOIL AND WATER CONSERVATION

934 Sierra Leone. Soil Conservation and Land Utilization Team. Sessional Pap. No. 1, 1951. **Soil conservation and land use in Sierra Leone.** By *E. A. Waldock* and others. 1951, pp. 128. [Freetown, Sierra Leone]

The Soil Conservation and Land Utilization Team set up in Sierra Leone carried out a survey of the Colony during 1949-50 and its report includes a detailed account and appreciation of the agricultural systems and trends of land use there, together with a record of areas eroded or in danger of degradation in the future. The numerous recommendations made are summarized and range from measures designed for the maintenance of fertility and the conservation of vegetation to the registration of land.—C.L.S.

935 Sudan Government, Ministry of Agriculture. Bull. No. 3. **The Gash Delta.** By *C. H. Richards*. [n.d.], pp. 56.

A general description of the area is given together with an account of the Gash irrigation scheme and its influence on local agriculture. Appendices are included giving details of the flooding of the Gash river from 1907-1949, cotton areas and yields from 1915-1950 and a glossary of vernacular terms with their English equivalents.—K.L.

936 Merwe, J. P. v. d. **Crop-rotation systems for the Eastern Orange Free State.** *Fmg S. Afr.* 1951, **26**, 383-6 and 392.

The author discusses crop rotation as a means of halting wind and water erosion and replenishing the soil of the Eastern Orange Free State. The choice of crops is based on: (a) their use as soil improvers; (b) cultural requirements; (c) value for animal nutrition and (d) cost. Summer cash crops used for clean cultivation include maize, kaffir-corn, sunflowers, groundnuts, potatoes, soyabeans and sugar beans while cover crops useful for grazing and feed include millet, teff, cowpeas, winter cereals for grazing, pumpkins and buckwheat. Little progress has yet been made in the use of perennial crops and leys. The most suitable ley crop for the area is a combination of lucerne and "oulandgras" (*Eragrostis curvula*). [From *Herb. Abstr.*]—K.L.

937 Kurtz, T. and others. **The importance of nitrogen and water in reducing competitio between intercrops.** *Agron. J.* 1952, **44**, 13-17 bibl. 3. [Illinois Agric. Expt Sta., Urbana]

Maize was planted in late May in slits made in gras and legume stands sown early during the sam spring. Where no N was applied, competition between the maize and the intercrops was sever and grain yields were very low. Where N wa applied and the plots irrigated, high yields of maiz and a heavy growth of the intercrops was obtained though maize yields did not quite reach the leve of those of maize crops grown alone and given treatment and irrigation. The results indicate that, under a system of intercropping, maize an the intercrops do not compete for immobile soi nutrients such as K and P, but do compete for th mobile nutrient N and for water. Soil erosion which can be serious in Illinois during the winte months, can be largely prevented by the use o intercrops which protect the soil during the winte when the maize crop has been removed. Where legume rotation is followed, maize can be sown i slits and sufficient of the intercrop left during th winter to control soil erosion. Sowing grass or ry in the maize crop during the autumn will also giv good soil protection. Both these practices requir the application of additional N to prevent seriou decreases in maize yields. The intercrop will als provide autumn and early spring grazing, whic offsets to some extent the reduction in maiz yields.—P.J.B.

938 Jacobson, P. **Are point rows necessary o terraced land?** *Soil and Water Conser* 1951, **6**, 172-4, illus.

If the slopes of a field do not vary over 2%, th number of point rows in a terraced system can b much reduced if the terraces are kept parallel b varying the grade within the terrace rather than b varying the horizontal interval. Practical steps t achieve this are given. [From *Herb. Abstr.*]—C.L.S.

939 Koblet, R. Pflanzenbau und Bodenfrucht barkeit. [**Crop cultivation and soil fertility.** *Schw. landw. Mh.* 1951, **29**, 355-73, bibl. 5

This is a general article on the relations betwee soil and crops. Throughout the paper the centr theme is the maintenance of soil fertility for pos terity.—D.B.

WEEDS AND WEED CONTROL

940 Thurston, Joan M. **Some experiments and field observations on the germination of wild oat (*Avena fatua* and *A. ludoviciana*) seeds in soil and the emergence of seedlings.** *Ann. appl. Biol.* 1951, **38**, 812-32, bibl. 2 [Rothamsted Expt Sta., Harpenden, Herts

Pot experiments and field observations show that most seeds of *A. fatua* germinated in sprin nd a few in autumn ; hardly any germinated in ummer or winter. Seeds of *A. ludoviciana* ger- ninated in winter only. The greatest depth of sowng from which seedlings of either species reached he surface was 9 in., but seedlings from this depth vere weak and yellow when they first appeared. l. *ludoviciana* gave more and sturdier seedlings han *A. fatua* from 6 and 9 in. There was no vidence of induced dormancy in seeds of *A. fatua* uried at depths down to 20 in. Germination of his species was hastened by monthly cultivation f the soil. The maximum survival of *A. fatua* was years in pots and slightly longer in the field ; eeds of *A. ludoviciana* in pots survived only 2 ears. The two or three seeds of each spikelet of . *ludoviciana* germinated in turn, starting with he largest, but the interval between germination f successive species varied. Seedlings from freshly own seeds of both species were more vigorous than eedlings from seeds which had been buried for a ear or more. Germination and subsequent growth f both species took place in soil of pH 4.5 to 7.0 pprox.—Author's abstract.

41 Indonesia. Bogor, General Agricultural Research Station. Contr. No. 120. **Notes on the water hyacinth in Indonesia and its eradication by spraying with 2,4-D.** By *K. F. Vaas.* 1951, pp. 61, bibl. 51. [Inland Fish. Lab., Gen. Agric. Res. Sta., Bogor, Indonesia]

ater hyacinth (*Eichhornia crassipes*) has spread ery widely in Indonesia during the last 50 years, nd has caused a considerable amount of damage, articularly to fresh-water fisheries and to canals. he biology, ecology and possible value of water yacinth as a fibre crop, compost and pig feed are utlined. The results are given of a number of trials which 2,4-Dow, Dicotox and 2,4-D butyl ester ere used to control the weed. None of the herbicides had any significant effect on fish or freshater biota. The application of sprays containing g. of any of the 3 herbicides per 1.5 m.^{2} gave fective control. A practical recommendation is a % solution applied at a rate of 2500 to 3300 l. per a. Higher dosages are required for old plants. praying wet leaves and spraying under cloudy onditions should be avoided. Rain falling not less ian 0.5 hr. after treatment does not limit the fectiveness of the herbicides, provided conditions ot specified] for assimilation and translocation ithin the plant are favourable. [See also *Fld Crop bstr.* 5 : 244.]—P.J.B.

2 Cock, R. E. **Blackberry control [in Tasmania].** *Tasm. J. Agric.* 1951, **22**, 332-5.

eneral recommendations for the control of blackerry (*Rubus fruticosus*) on cultivated land in asmania are discussed with particular reference the herbicide 2,4,5-T.—K.L.

943 Plant, W. **Hormones kill horsetail.** *Fmr & Stk-Breed.* 1952, **66**, 34-5, illus.

Marsh horsetail or snake-pipe (*Equisetum palustre*) can be killed by applying 2.5 pt. MCPA (Agroxone) dissolved in 10-15 gal. of water at a rate of 10 gal. per ac. using a low volume spraying outfit. [From *Herb. Abstr.*]—C.L.S.

944 Gazzera, E. Sulle mondiglie di alcuni cereali autunno-vernini coltivati a Rocca Priora (Roma). [**The weed seeds of some autumn-winter cereals grown at Rocca Priora (Rome).**] *Nuovo G. bot. ital.* 1950, **57**, 647-51, bibl. 7, English summary p. 651.

A list is given of the species of weed seeds found, before sifting, in wheat and rye seed from this zone, which is situated in a valley at nearly 600 m.a.s.l. The particular ecological conditions of this area are described.—E.B.O.

945 Indonesia. Bogor, General Agricultural Research Station. Contr. No. 108. **Weed control with synthetic growth hormones.** By *G. A. W. van de Goor.* 1950, pp. 45, bibl. 52. [Bogor]

The results are given of trials with 2,4-D for the control of nutgrass (*Cyperus rotundus*), *Lantana camara* and the use of 2,4-D for weed control in groundnuts and rice. With nutgrass, several applications of 2,4-D were necessary to achieve control ; with *L. camara*, at least two treatments were required. With groundnuts, pre-emergence applications of 2,4-D, one, or two weeks before sowing gave good control of broad-leaved weeds, without significantly reducing groundnut yields, but stimulated the growth of grass weeds. With rice, 2,4-D treatments did not significantly raise grain yields. Good control of broad-leaved weeds was secured, but again, grass weeds were stimulated. Only where labour is scarce and the water supply is such as to entail the presence of a high proportion of aquatic weeds, is it considered that 2,4-D will be effective for weed control in rice.—P.J.B.

946 Piacco, R. Il diserbo biochimico della risaia con particolare riguardo all'impiego del "Weedone." [**The biochemical weeding of rice-fields with particular reference to the use of Weedone.**] *Risicoltura* 1951, **39**, 1-8, illus. [Sta. sper. Risicolt. e Colt. irrigue, Vercelli, Italy]

The use of Weedone (40% ester 2,4-D) for the control of weeds in rice-crops is described. The dose employed varies from 0.5 kg. to 1.5 kg. (200 to 600 g. active substance) per ha., a dose of 1 kg. being more frequently suited to conditions in the Po Valley. If the Cyperaceae weeds are destroyed in 5 to 6 days, it is an indication that the dose employed was too strong and that it should be gradually reduced. [See also *Fld Crop Abstr.* 3 : 153, 4 : 221 and 1156.]—E.B.O.

947 SOKOLOFF, V. P. **Biological control of weeds in compacted soil cultures.** *Science* 1951, **114**, 271-4 [Isaiah Bowman School of Geography, John Hopkins Univ., Baltimore, Md]

A considerable loss of irrigation water and damage to conduits is caused in the USA by the penetration of asphalt- and concrete-lined irrigation pipes and canals by the roots of weeds. To date, no effective means of combating these losses has been devised. Laboratory studies were made to determine the possibility of lowering the resistance of the seeds and roots of brome grasss (*Bromus inermis*), Buffalo grass (*Buchloe dactyloides*) crested wheatgrass (*Agropyron cristatum*), beans, and sweet clover (*Melilotus alba*), so that they could be destroyed by bacterial and fungal invasion. Fertile soil was compacted and supplied with sufficient moisture to reduce its pore space to the lowest degree possible. The soil was then treated with pure nitrates of K and Ca mixed with either cane molasses, or glucose. The soil was placed in containers and seeds of the above-mentioned species were sown on the surfaces of the compacted soil. A further thin layer of soil was added and the whole sealed over with a 0.25 in. layer of asphalt. Determinations were made of the germination of the seed and the damage to the asphalt cap by the plants or by the gases evolved. The results indicated that seed germination had been almost entirely prevented and the growth of seedlings arrested. The compaction of the soil, and the addition of carbohydrates and nitrates, resulted in rapid exhaustion of the oxygen in the soil by encouraging the growth of anaerobic bacteria. The evolution of gases in the treated soil could be minimized by controlling the C : N ratio in the soil solution, thus protecting the asphalt capping. Compaction of the soil alone was not sufficient to prevent seed germination. The need for field trials of this technique is stressed.—P.J.B.

948 OSVALD, H. Kemiska medel i kampen mot ogräset. [**Chemicals in the fight against weeds.**] *Nord. Jordbr Forskn.* 1951, **31/32**, 384-92.

A review is given of the trial results in Scandinavia with a wide range of herbicides, including sodium chlorate, TCA, DNOC, DNBP, pentachlorophenol, 2,4-D, 2,4,5-T and IPC.—P.J.B.

949 ONTARIO Department of Agriculture. Extn Circ. No. 75. **Handbook of chemical weed control.** 1951, pp. 21.

Practical recommendations are given on the use of herbicides on field crops, methods of application and suitable spray equipment.—P.J.B.

950 YOUNG, H. C. and CARROLL, J. C. **The decomposition of pentachlorophenol when applied as a residual pre-emergence herbicide.** *Agron. J.* 1951, **43**, 504-7, bibl. 16. [Ohio Agric. Expt Sta., Wooster]

Pot experiments were carried out to determine the rate of decomposition of pentachlorophenol applied as Shell 130 (pentachlorophenol in oil) at a rate of 10 gal. per ac. to Wooster silt loam (pH 6.3) and to new and old muck soils (pH 4.8 and 5.2, respectively). The different soil samples were treated as follows : (a) surface soil mixed and stirred after herbicide application, (b) herbicide applied, soil not disturbed, but 1 in. of water applied every week ; controls were treated with the herbicide, only. The results showed that at 32 days after the time of application, the amount of herbicide left was very much the same in all the soils given the same treatment, though the initial rate of loss was higher in the muck than in the mineral soils. The rate of disappearance of the herbicide was greatest in the watered pots, though leaching did not appear to be primarily responsible for this. The herbicide decomposed more rapidly at high than at low temperatures and most rapidly where the moisture content of the soil approached its moisture equivalent. The results indicate that the use of pentachlorophenol as a pre-emergence herbicide may entail some risk to crops. In these experiments, the soils used, which contained 20 to 30% of the original applications of pentachlorophenol at the end of the trial period, were sown to sugar-beet, maize and beans, all of which germinated and emerged normally.—P.J.B.

CROP BOTANY

951 GOODWIN, R. H. and others. **The distribution and properties of a porphyrin from the epidermis of *Vicia* shoots.** *Amer. J. Bot.* 1951, **38**, 629-35, bibl. 9, illus. [Connecticut Coll., New London, and Carnegie Inst. of Washington, Stanford, Calif.]

Relatively large cytoplasmic bodies occur in epidermal cells adjacent to the guard cells of stomata in stems and leaves of *Vicia gigantea*, *V. cracca*, *V. benghalensis* and *V. disperma*. The bodies fluoresce under ultra-violet radiation. They have not yet been observed in the forage species *V. sativa*, *V. faba* or in the related *Phaseolus vulgaris*. The shape, distribution and properties of these bodies are described. The substance responsible for the fluorescence is probably a porphyrin polycarboxilic acid. [From *Herb. Abstr.*]—D.B.

952 O'BRIEN, J. A. **Plastid development in the scutellum of *Triticum aestivum* and *Secale cereale*.** *Amer. J. Bot.* 1951, **38**, 684-96, bibl. 28, illus. [Catholic Univ. Amer., Washington, D.C.]

Plastid development in the epithelium and parenchyma of the scutellum of *Triticum* and *Secale* during germination takes place in an aggregation associated with a region of the cytoplasm which ppears homogeneous in fixed cells. The aggregation usually develops adjacent to the nucleus. These plastids function in the temporary storage of starch uring germination of the grains. After development in the aggregation, the plastids disperse into he surrounding cytoplasm where starch grains orm in them, although occasionally starch may orm before dispersal takes place. When starch ormation is complete, the plastid matrix apparently is not longer present. Digestion of the grains esults in the formation of small vacuoles. Evidence ndicates that this plastid development may take lace more than once during germination. The cells lso contain numerous granular mitochondria but here is no evidence that the plastids develop from hese. It is suggested that the nucleus intervenes n the formation of plastids which develop in the ggregation.—From author's summary.

53 DE ROPP, R. S. **The growth capacity of the sunflower hypocotyl.** *Plant Physiol.* 1951, **26**, 778-83, bibl. 2, illus. [New York Bot. Gard. New York, N.Y.]

he growth capacity of excised fragments taken om different regions of the hypocotyl of *Helian-* *us annuus* var. Russian Giant was studied under ree sets of conditions: (1) on sucrose mineral gar, (2) on sucrose mineral agar to which indole-3-cetic acid (IAA) (1.0, 0.1 and 0.01 mg./l.) had been dded and (3) on sucrose mineral agar after in- culation of the fragment with crown-gall bacteria. he fragments were 5 mm. long and were cut from ypocotyls which had been grown under aseptic onditions. The growth capacity of the fragments as measured by increase in length, increase in readth, fresh weight, dry weight and production f adventitious roots. Capacity for elongation was calized mainly in fragments taken from the apex f the hypocotyl (top 10 mm.) and this capacity as enhanced by the presence of IAA (0.01 mg./l.). apacity for growth in breadth and for increase in esh and dry weight was less in the upper than in e lower part of the hypocotyl, but when grown the presence of IAA (1.0 or 0.1 mg./l.) and of own-gall bacteria these differences were elimin- ed. Capacity for production of adventitious roots as lowest in fragments taken from the uppermost mm. and though enhanced by IAA (0.1 mg./l.) d inoculation with crown-gall bacteria it still mained lower than in lower parts of the hypo- tyl. Capacity for tumour production as a result of inoculation was about equal in fragments from all regions.—D.B.

954 HEIMSCH, C. **Development of vascular tissues in barley roots.** *Amer. J. Bot.* 1951, **38**, 523-37, bibl. 34, illus. [Univ. Texas, Austin]

The object in selecting roots of barley for investigation was to provide developmental data for comparison with those previously found for dicotyledonous roots, and also for use in the interpretation of results of physiological studies on barley roots. Roots of *Hordeum sativum* var. Sacramento grown in culture solution were investigated. Roots were examined by serial transverse and serial longitudinal sections and by cleared whole mounts. Generally, differentiation of all vascular tissues is initiated within 300 μ of the apical cells. The direction of differentiation and maturation of all vascular elements is acropetal. The order of differentiation and of maturation of protophloem, protoxylem, metaphloem and metaxylem are given. Only slight differences occur among roots as regards the distance from the apex at which vascular tissues are differentiated, but marked differences occur as regards the distance from the apex at which they mature. These differences are associated with the rate of elongation of roots. The findings are discussed in relation to certain aspects of root function and the utilization of root materials in experimental investigations. [From *Herb. Abstr.*]—D.B.

955 HUNT, G. E. **A comparative chromatographic survey of the amino acids in five species of legume roots and nodules.** *Amer. J. Bot.* 1951, **38**, 452-7, bibl. 15, illus. [Cornell Univ., Ithaca, N.Y.]

The work was undertaken as a qualitative and quantitative survey of the nitrogen compounds present in uninoculated and inoculated root tissue and in nodules. Because of its sensitivity the technique of partition chromatography was used rather than chemical methods. The technique is especially valuable when only micro-quantities of nodular tissue are available. The species chosen for experiment were *Phaseolus vulgaris* var. Michelite, *Pisum sativum* var. Thomas Laxton, *Glycine soja* var. Seneca, *Trifolium pratense* var. Kenland and *Medicago sativa* var. Buffalo. The plants were grown on a sand and soil mixture with a minus nitrogen nutrient solution and inoculated with the appropriate strain of *Rhizobium*. At various stages of growth, from 3 days to 3 months, the plants were harvested and chromatographic analyses were made of their root tissues and nodular tissues when these were present. Twenty-four compounds were identified and eleven unknown substances were mapped from these tissues. Five of the latter appeared to be unique for the nodular tissue. Of the five, three had mobilities similar to that of the valine and γ-hydroxyleucine. It was suggested that this might indicate that compounds similar to valine or the leucines were involved in the normal nitrogen assimilation in the root of the legume. [From *Herb. Abstr.*]—D.B.

956 NANCE, J. F. and CUNNINGHAM, L. W. **Evolution of acetaldehyde by excised wheat roots in solutions of nitrate and nitrite salts.** *Amer. J. Bot.* 1951, **38**, 604-9, bibl. 25, illus.

A study of the evolution of acetaldehyde by excised wheat seedling roots in the presence of nitrate and nitrite salts is reported. Salts of manganese, iron, and molybdenum, all of which stimulate nitrate assimilation, enhance acetaldehyde production by roots in solutions of KNO_2, though the effect on roots in KNO_3 solutions is rather inconclusive. $CaSO_4$, known to inhibit nitrate assimilation, inhibits acetaldehyde evolution by roots in KNO_2 and KNO_3 solutions. Oxygen, which also inhibits nitrate assimilation under certain conditions, inhibits acetaldehyde evolution by roots in KNO_3 solutions. Acetaldehyde evolution by roots in KNO_2 is stimulated by oxygen; however, with the maximum response at 4% of O_2. Carbon dioxide tensions up to about 1% are stimulatory to roots in KNO_2 and KNO_3. Citrate additions in the presence of added manganese stimulate acetaldehyde production by roots in KNO_2. Since nitrate assimilation and acetaldehyde evolution are influenced in like fashion by a number of factors, it is inferred that the aldehyde arises as the result of the active utilization of nitrate. This effect is interpreted as evidence for the oxidation of reduced coenzyme I by nitrate and intermediates of nitrate assimilation. [See also *Fld Crop Abstr.* 2 : 886.]—Authors' summary.

957 BOLLI, M. Ricerche sulle vitamine. 5. Gli effetti dell' acido ascorbico sulla traspirazione delle piante superiori. Rapporto : respirazione-traspirazione. [**Research on vitamins. 5. The effects of ascorbic acid on the transpiration of higher plants. Ratio : respiration-transpiration.**] *Ann. Fac. Agr. Univ. Perugia* 1949, **6**, 138-51, bibl. 10. [Received 1952] [Ist. bot. Univ. Perugia, Italy]

Results from trials, carried out with *Melilotus italica* and other plants, indicated that treatment with ascorbic acid increased considerably the transpiratory activity of the plants tested, this being a consequence of the increased respiratory activity caused by the same substance. [See *Fld Crop Abstr.* 4 : 30 and 878.]—E.B.O.

958 DE CAPITE, L. Tiamina, riboflavina e nicotinamide nei processi dissimilativi. [**Thiamine, riboflavin and nicotinamide in the katabolic processes.**] *Ann. Fac. Agr. Univ. Perugia* 1949, **6**, 59-68, bibl. 9. [Received 1952] [Ist. bot. Univ. Perugia, Italy]

A trial, carried out with one-leaf seedlings of wheat, oats and barley, grown in nutrient solutions containing known quantities of thiamine, riboflavin and nicotinamide, indicated that these vitamins increase the respiratory activity of plants. It would appear that they increase the katabolic processes which take place in the plant cell.—E.B.O.

959 TONZIG, S. Osservazioni sopra le oscillazioni giornaliere della CO_2 dell'aria a disposizione delle piante superiori nei diversi periodi dell'anno. [**Observations on the daily fluctuation of atmospheric CO_2, available to higher plants at different periods of the year.**] *Nuovo G. bot. ital.* 1950, **57**, 583-618, bibl. 11, English summary p. 618. [Received 1951] [Ist. bot., Univ. Milano, Italy]

Air samples were taken near S. Angelo Lodigiano, Milan province, from October, 1946, to October, 1947, from an area growing wheat, oats, rye, maize, and *Brassica campestris* var. *oleifera*. The samples were drawn, at foliage level, at approx. 4-day intervals, 3 times a day, i.e., at about 8 a.m., midday and sunset. The results of CO_2 determination on these samples, shown in tables and graphs, indicate that the CO_2 content of the air fluctuates, during the year and during the day. The reasons for this periodicity are discussed with particular reference to the influence of environmental factors, mainly temperature and water availability, on the activity of the microflora of the soil (the most important source of CO_2 in the air), and on the consumption of CO_2 by plants. The relation between CO_2 consumption and the biological type of plant is also examined.—E.B.O.

960 BREAZEALE, E. L. and others. **Water absorption and transpiration by leaves.** *Soil Sci.* 1951, **72**, 239-44, bibl. 6. [Arizona Agric. Expt Sta.]

This is a contribution to the study of water absorption and transpiration by leaves in relation to sprinkler irrigation under semi-arid conditions. In the greenhouse experiments described, water absorption and transpiration by leaves of maize seedlings were measured quantitatively under varying conditions of humidity obtained by employing 2 " fogger " sprays. The greenhouse was open during the day and closed at night. The day temperature range was 75 to 101°F. and the night temperature was maintained at 70°F. The maize seedlings were grown in culture solution flasks and in soil containers. No water was added to the flasks or to the soil during the experiments. In one water culture experiment, in which the relative humidity range was 12 to 14% in the day and 75 to 85% at night and the fog sprays were not in direct contact with the plants, there was a water loss by day which was 4 times the gain at night. In another experiment the maize seedlings were growing in soil under 2 different conditions of moisture: in (a) the plants were within the range of the fog spray at night but not during the day; in (b) the plants were within the range of the fog spray during the day but not at night. Results, which are shown graphically, indicate that in (a) there was a great transpiration loss by day and a great gain by night, the gain being smaller than the loss; while in (b) there was a small gain by day and an equivalent loss by night.—E.B.O.

961 LEOPOLD, A. C. **Photoperiodism in plants.** *Quart. Rev. Biol.* 1951, **26**, 247-63, bibl. 110. [Purdue Univ., Lafayette, Ind.]

The physiological aspects of photoperiodism are discussed, including the role of light, darkness, temperature, inorganic nutrients, auxins, metabolites and growth, and an outline of the nature of a postulated flowering hormone. A brief review is given of theories explaining photoperiodism. [From *Herb. Abstr.*]—P.J.B.

962 PARKER, M. W. and others. **Photoperiodic responses of plants and animals.** *Nature, Lond.* 1952, **169**, 242-3, bibl. 6. [Plant Industry Sta., Beltsville, Md]

[See also title recorded in *Herb. Abstr.* 20: 946.] Measurement of the action spectra which determine: (1) flowering in certain long- and short-day plants; (2) the promotion of leaf elongation in dark-grown seedlings of *Pisum sativum*; and (3) the inhibition of elongation of the second internode in barley seedlings, has shown that each spectrum is of the same type, with maximum effectiveness in the red near 6200-6600 A., decreasing to a minimum near 4600 A. At this minimum, more that a hundredfold greater incident energy is required for a response equal to that in the red. As chlorophyll is the predominant pigment in the plants, the question regarding distortion of the action spectrum from reflecting the absorption spectrum of the effective pigment has arisen. The author discusses the chemical nature of the effective pigment in plants, from observation of its absorption spectrum. While there is an indication that the total absorption of incident radiation by the effective pigment in a leaf in the region of maximum effectiveness is less than 0.001%, yet the pigment has still to be isolated. There is confirmation that the interruption of light intervals by dark intervals controls reproduction in animals as well as in plants but the nature of the initial reaction to light involved in these responses is unknown for both plants and animals. [From *Herb. Abstr.*]—M.H.

963 GOODWIN, R. H. and OWENS, Olga H. **The effectiveness of the spectrum in *Avena* internode inhibition.** *Bull. Torrey bot. Cl.* 1951, **78**, 11-21, bibl. 15. [Connecticut Coll., Bot. Dept, New London]

The inhibitory effect of 9 different wavelengths of monochromatic light on the elongation of the first internode of *Avena sativa* seedlings grown in dark is reported.—From authors' summary.

964 THOMSON, Betty F. **The relation between age at the time of exposure and response of parts of the *Avena* seedling to light.** *Amer. J. Bot.* 1951, **38**, 635-8, bibl. 11, illus. [Connecticut Coll., New London]

[This is a continuation of studies reported in *Fld Crop Abstr.* 4: 538.] "Seedlings of *Avena sativa* var. Victory were grown in total darkness except for a single 3-hr. exposure to white light. Exposures were made at various ages from 1-10 days and the subsequent growth curves of each seedling organ determined by measurements made on a series of plants harvested at 1-day intervals. Each part of the plant responds independently to light and according to the stage of its development at the time it is exposed." The effect of exposing the internode to light at the various stages of development is as follows: (1) before elongation has begun, light advances the time of onset of elongation and increases the rate of rapid elongation but the final length is unchanged; (2) after elongation has already started, elongation is retarded and the final length is reduced; (3) towards the end of elongation, light causes immediate cessation of growth. Coleoptiles behave in the same way as internodes. [From *Herb. Abstr.*]—D.B.

965 RAZUMOV, V. I. [**The significance of long periods of darkness during plant development.**] [Russian] *Doklady Acad. Sci. SSSR* 1951, **80**, 269-72, bibl. 8. [All-Union Inst. Plant Industry, Leningrad]

In order to study the inter-relationship between the processes of growth and development, the author carried out tests with two short-day plants, *Perilla novinka* and teosinte (*Euchlaena mexicana*). These plants do not progress to the light stage in long-day conditions. Specimens of both species were studied at two different stages of growth, namely, newly-emerged seedlings and 50-day old plants grown (prior to these experiments) in 24-hour illumination daily.

Experiment I. The light regime was as follows [during 48-hour periods for variants (1) to (3)]: (1) 14 hours light, 34 hours darkness; (2) 12 hours light and 36 hours darkness; (3) 10 hours light and 38 hours darkness; (4) 6-hour normal day; and (5) 8-hour normal day. The observations covered a period of 115 days. For the above 5 variants data are tabulated giving individual plant weight, numbers of days to flowering, and the number of days flowering is retarded compared with the flowering date under an 8-hour day. It is concluded that the plants' reaction to light depends on their growth stage. *Perilla* seedlings in (3) died out. Under (1) and (2) organic nutrients accumulated slowly in the seedlings and development was greatly retarded compared with (5). Teosinte seedlings in variants (1), (2) and (3) did not flower. The older plants under conditions (1), (2) and (3) developed more normally, as in an 8-hour day (5). This indicates that long periods of darkness (34-38 hours are suitable for older plants but not for seedlings. Apparently the metabolism of young plants grown in long dark periods does not facilitate passing to the light stage of development.

Experiment II. This was designed similarly to variant (2) in experiment I, with the modification that the dark period was interrupted with a light interval of 3 different durations. These intervals (1 hr., 30 mt., 20 mt.) accelerated development in both young and old plants. While it is known that light intervals which divide darkness into periods of less than 9 or 10 hours prevent the development of short-day plants, a 17-hour period of darkness is sufficiently long for the light stage of development to pass. It is concluded in general that the effect of light on plants which are at the same stage of development (although of different age) may be either favourable or unfavourable for development, depending on the plants' metabolism. [See also *Herb. Abstr.* 15 : 328.]—M.H.

966 Purvis, O. N. and Gregory, F. G. **Studies in vernalization. 12. The reversibility by high temperature of the vernalized condition in Petkus winter rye.** *Ann. Bot., Lond.* 1952, **16**, 1-21, bibl. 15. [Res. Inst. Plant Physiol., Imp. Coll. Sci. Technol., London, S.W.7.]

The reversibility of vernalization in Petkus winter rye has been studied in detail, by using alternating periods, during germination, of low and high temperature of varying durations. The degree of devernalization by exposure to subseqeunt high temperature varies with the initial duration of vernalization and becomes progressively less as vernalization proceeds. A quantitative method of studying these effects is described, and a revised scheme of the dynamic aspects of vernalization put forward. [From *Herb. Abstr.*]—Authors' summary.

967 Wallace, T. **The diagnosis of mineral deficiencies in plants by visual symptoms.** 2nd ed., pp. 114, pl. 312, London ; H.M. Stationery Office, 1951, 25 × 16, Price 35s. [Univ. Bristol, Agric. and Hort. Res. Sta., Long Ashton]

[See *Herb. Abstr.* 13 : 1979.]

968 Karlsson, N. Något om biogena mikroelement och deras förekomst i marken och fodret. [**Concerning trace elements and their occurrence in the field and in fodders.**] *Växtnärings Nytt.* 1951, **7**, No. 5, 24-31.

Tables give the average content of macro- and trace-elements in vegetation and in top soil, and the Fe, Mg, Zn and Cu content of field crops.—P.J.B.

969 Kuang Lu Cheng and Bray, R. H. **Determination of calcium and magnesium in soil and plant material.** *Soil Sci.* 1951, **72**, 449-58, bibl. 13. [Illinois Agric. Expt Sta. Urbana]

Procedures for determining the Ca and Mg content of soil extracts and solutions of digested plant material by means of versenate titrations are described.—From authors' summary.

970 Lehr, J. J. **Importance of sodium for plant nutrition : 5. Response of crops other than beet.** *Soil Sci.* 1951, **72**, 157-66, bibl. 5. [Plant Nutr. Res. Lab., Chilean Nitr. Agric. Serv., Wageningen, Holland]

The immediate and residual effects of Na on different crops in a 7-year sequence on a humic sandy soil, were investigated in a field trial by comparing Chilean nitrate of soda with calcium nitrate at 4 different K levels. The control plots received no K dressing. The above effects were more marked in the latter years of the experiment. Symptoms of K deficiency were observed in turnips on the control plots dressed with calcium nitrate even with a low application of potash. Na prevented such symptoms. Significant responses to Na were recorded at all K levels in one of 2 varieties of potatoes and in turnips but usually the response decreased at higher K levels. With turnips, at the highest K level, the extra yields due to Na were offset by lower dry-matter content, whereas, at a medium K level, the Ca salt gave slightly higher yields of total dry matter. Response of oats, both straw and grain, to Na was significant only on the control plots. At the higher K levels, total yields from both nitrates were comparable, but Na tended to lower the ratio of grain to straw. In general, response to Na was least at a moderate K level and greatest at the lowest K level, suggesting that Na reduces the dependence of yield on soil K. Barley grain, dressed with Na, contained a smaller quantity of hulls.—From author's summary.

971 Drake, M. and others. **Cation-exchange capacity of plant roots.** *Soil Sci.* 1951, **72**, 139-47, bibl. 10. [Massachusetts Agric. Expt Sta.]

Differences in the ability of plants to take up cations from the soil are largely controlled by the cation-exchange capacity of the plant root and the valence of the cation. At low concentrations divalent cations (Ca) are absorbed in relatively greater amounts than monovalent cations (K) from the soil colloid, the greater the cation-exchange capacity of the plant root colloid. A study was made of the relative cation-exchange capacity of roots of agricultural plants and weeds. The plants were grown in granite grit with a nutrient solution. A method for measuring the relative cation-exchange capacities of plant roots was developed. The cation-exchange capacities of the roots of the dicotyledonous plants investigated were roughly double the value for the monocotyledonous plants. This fact helps to explain the relatively high content of divalent cations in legumes and other dicotyledonous plants. As the total of the cations in plants tends to be a constant, the monocotyledonous plants take up greater amounts of K at low concentrations than the dicotyledonous plants. Thus, in grass-legume associations at low levels of soil K, grasses are able to obtain much more K than the legumes, to the extent that legume yields and longevity of stands may be seriously reduced. It appears that on a surface-area basis, legume roots have cation-exchange capacities many times as great as grasses. The high cation-exchange capacity of roots, the limited root system and high K requirements for translocation and storage of starch in the potato plant explain the need of this crop for abundant quantities of available K. The relationship of cation-exchange capacity of plant roots and mono-divalent cation absorption differential was demonstrated to hold only at low ionic concentrations.—From authors' summary.

972 Wittwer, S. H. and Lundahl, W. S. **Autoradiography as an aid in determining the gross absorption and utilization of foliar applied nutrients.** *Plant Physiol.* 1951, **26**, 792-7, bibl. 3, illus. [Michigan State Coll., East Lansing]

" Autoradiograms provide one of the best means of obtaining indications of relative metabolic activities of various plant tissues since their accumulative capacities for many of the foliar applied nutrients is clearly revealed and located. Herein is presented a method of simultaneously preparing a large number of autoradiograms of entire plants, such that the intensity of the images is within limits proportional to the concentration of the radioactive material in the tissues derived from various applications of radio-phosphorus." Autoradiograms of bean, maize and tomato plants are shown. They demonstrate that leaves are efficient organs for absorption of radio-phosphorus and that young expanding leaves are more efficient than older ones in absorbing nutrients.—D.B.

973 Graham, E. R. and Baker, W. L. **Ionic saturation of plant roots with special reference to hydrogen.** *Soil Sci.* 1951, **72**, 435-41. [Missouri Agric. Expt Sta., Columbia]

The results are given of studies to determine methods of measuring the active H at the root surface of oats, wheat, barley, rye and soyabeans, and to investigate the degree to which H saturates the total exchange possibilities of root surfaces and the total cations removed by electrodialysis of plant roots. The effect of degree of maturity of the plants and temperatures is considered.—P.J.B.

974 Gobis, Livia. Sul significato biologico dell'acido citrico. Nota 2. [**The biological significance of citric acid. Note 2.**] *Ann. Sper. agr.* 1951, **5**, 1481-6, bibl. 3, English summary p. 1486. [Sta. sper. del Freddo, Milano, Italy]

[See Abs. 278.] The investigation was extended to include the seeds of a greater number of species, including peas, *Pisum sativum*, and soyabeans among the Leguminosae, and oats, rice and maize among the Gramineae. Results confirmed as a whole those obtained previously. The new values of the nitrogen to citric acid ratio obtained brought the average value of this ratio, for the seeds so far examined, from 3 for the dormant seed of the Leguminosae and 9 for the dormant seed of the Gramineae to 5.6 and 10.5, respectively.—E.B.O.

975 Bolli, M. L'azione del talco sulla germinazione dei semi. Nota preventiva. [**The action of talcum on seed germination. Preliminary note.**] *Ann. Fac. Agr. Univ. Perugia* 1949, **6**, 229-30, illus. [Received 1952] [Ist. bot. Univ. Perugia, Italy]

A commercial preparation, described as containing talcum powder and a hormone which stimulates germination, was tested on seeds of wheat, rye, barley, maize, beans, etc., and compared with seed treated with talcum powder alone. It appeared that both the commercial preparation and the pure talcum powder had a similar stimulating effect on germination and that this effect varied with temperature.—E.B.O.

976 Rhodes, A. and Ashworth, R. de B. **Mode of action of growth regulators in plants.** *Nature, Lond.* 1952, **169**, 76-7, bibl. 5. [I.C.I. Ltd., Jealott's Hill Res. Sta., Bracknell, Berks.]

The authors suggest that the prime factor initiating plant growth response to indole-3-acetic acid and the phenoxyacetic acids may be an access of energy from energy-rich phosphate bonds, possibly enol phosphate linkages, generated by the metabolism of these compounds within the plant. Phenoxyacetic acids, to be active, would require a free ortho position, a mobile hydrogen atom on the α-carbon and, in the presence of inorganic phosphate, the formation of an ester phosphate linkage. [From *Herb. Abstr.*]—Authors' abstract.

977 NAUNDORF, G. Formación de pelos radicales en relación con la auxina. [**Formation of root hairs in relation to auxin.**] *Acta agron. Palmira* 1951, **1**, No. 4, 205-11, bibl. 9, English summary p. 210. [Agric. Expt Sta. Palmira, Colombia]

Experiments with various crop plants are described. They prove that auxins directly stimulate the formation of root hairs and, according to concentration, increase or reduce their number per unit of root-area. Seed treated with a mixture of nutrient substances, minor elements, fungicides and phytohormones produced roots with more root hairs, as a first effect of treatment, than did untreated seed.—From author's summary.

978 SASS, J. E. **Response of meristems of seedlings to benzene hexachloride used as a seed protectant.** *Science* 1951, **114**, 466, bibl. 5. [Bot. and Plant Pathol. Dept, Iowa State Coll., Ames]

A brief note is given of the effect of BHC in producing abnormal cell division in seedling meristems. [From *Herb. Abstr.*]—P.J.B.

979 NAYLOR, A. W. and DAVIS, E. A. **Respiration response of root tips to maleic hydrazide.** *Bull. Torrey. bot. Cl.* 1951, **78**, 73-9, bibl. 18.

The respiratory response of various monocotyledonous and dicotyledonous species to change in acidity and to maleic hydrazide was investigated. The effect of increase in acidity alone, from pH 6.0 to pH 4.0, was to stimulate respiration in sunflower, maize, barley and oats, and to depress respiration in wheat. The respiration of root tips of none of the species tested was appreciably affected by maleic hydrazide at pH 6.0 ; but, as the maleic hydrazide solutions were increased in acidity, oxygen consumption of all species decreased. The respiration of barley, wheat and oat roots was more severely affected by all the concentrations of maleic hydrazide used (0.05, 0.10, 0.20 and 0.40%) than the roots of any of the other plants tested. Maize roots were most resistant to maleic hydrazide poisoning, while sunflower roots proved intermediate in response. Inhibition of respiration in maize and oats by maleic hydrazide increased with time. Possible modes of action of maleic hydrazide on the respiratory mechanism are discussed.—From authors' summary.

980 OVERBEEK, J. van and others. **Difference in activity between 2,4-dichlorophenoxyacetic acid and other auxins, and its significance in herbicidal action.** *Plant Physiol.* 1951, **26**, 687-96, bibl. 69, illus. [Shell Oil Co., Modesto, Calif.]

The herbicidal action of 2,4-D is considered to consist of two steps : (1) the very high activity of 2,4-D as an auxin, and (2) the metabolic changes brought about by this auxin activity. It is in the first step that 2,4-D differs from the other, " non-herbicidal," auxins. It is a quantitative rather than a qualitative difference. It is in the second step that the phytocidal effects take place. Based on data available in the literature it was reasoned that auxins bring about a change in the plant's metabolism. Abnormally high auxin concentrations might conceivably lead to abnormal accumulations of metabolites, such as coumarin derivatives. Because of its very high auxin activity, 2,4-D can be expected to bring about such metabolic changes to a larger degree than other, " non-herbicidal " auxins. One of these coumarin derivatives, β-methyl umbelliferone, has been shown to be more toxic to broad-leaved plants than to grasses. Thus, a 2,4-D-induced accumulation of metabolites, among which coumarin derivatives suggest themselves at the present state of knowledge, is capable of explaining both the phytotoxicity and the selectivity of this auxin herbicide.—From authors' summary.

981 KATHREIN, H. R. **A technique for the cultivation of higher plants under sterile conditions.** *Plant Physiol.* 1951, **26**, 843-7, bibl. 6, illus. [The Samuel Roberts Noble Foundation, Ardmore, Oklahoma]

An apparatus is described and illustrated which was used for growing oat plants. Complete sterility was maintained over a period of 8 weeks, after which the plants were harvested.—D.B.

982 GERMAN, F. and BOWEN, V. T. **A technique for growing plants under sterile conditions.** *Plant Physiol.* 1951, **26**, 840-2, bibl. 4, illus. [Brookhaven Nat. Lab., Upton, Long Island, N.Y.]

An apparatus is described and illustrated which was designed to eliminate the daily changing of the nutrient solution and to give an adequate carbon supply.—D.B.

MISCELLANEOUS

983 UNITED STATES Department of Agriculture. **Directory of organization and field activities of the Department of Agriculture : 1950.** *Agric. Handb.* No. 12. pp. 315, Washington; U.S. Govt Printing Office, 1950, 65 cents.

984 TEXAS Agricultural Experiment Station. Circ. 128. **Agricultural research publications available : technical articles published during 1950.** pp. 50, College Station, Texas, 1951.

985 South Africa. Council for Scientific and Industrial Research. **Research Organizations in the Union of South Africa.** pp. 142, Pretoria, 1950.

As well as providing information on the main Research Organizations of South Africa this directory also lists the names of the directors or officers-in-charge of departments and the nature of the research work in progress.—K.L.

986 Nyasaland Agricultural Quarterly Journal. **The new role of the Tung Experimental Station [Cholo, Nyasaland].** *Nyasaland agric. Quart. J.* 1951, **10**, 37-65.

The main aims of the above Station since it changed from its former role of Tung Research, are to gain information on mixed farming for local conditions and to aid in the Protectorate's drive for greater self-sufficiency in food supplies. Research is now in progress to find suitable alternative crops for tea and coffee and to investigate the possibilities of improving land by temporary leys. The crops which are under trial include wheat, maize, potatoes, soyabeans, groundnuts, and various catch crops of roots.—K.L.

987 Argentina. Ministerio de Educación, Universidad de Buenos Aires. Compilación de las bibliografias existentes en la biblioteca de la Facultad de Agronomía y Veterinaria. [**List of the bibliographies present in the library of the Agronomy and Veterinary Department.**] pp. 30, 1951.

988 Zeller, A. Die neuen Verfahren zur Berechnung und Anlage landwirtschaftlicher Versuche. (Ein Überblick.) [**New methods of analysing and laying out agricultural experiments. (A review.)**] *Veröff. Bundesanst. alp. Landw. Admont* 1951, No. 4, 43-68, bibl. 17, illus.

989 Ferrari, T. J. **Growth factors and soil productivity. Results of a multifactor-analysis.** *Trans. internat. Soil Sci. Congress* 1951, **1**, pp. 5. [Agric. Expt Sta. and Inst. Soil Res., T.N.O., Groningen, Netherlands]

Examples are given of the use of multifactorial analysis for the theoretical prediction of crop yields. By the use of this method, objective values can be arrived at for the formulation of land-use planning and soil improvement.—P.J.B.

990 Netherlands. Directie van de Landbouw. Landbouw No. 12. Methoden van het Rijksproefstation voor zaad contrôle voor het onderzoek van zaaizaden. [**Methods of seed testing in use at the State Seed Testing and Seed Control Station.**] pp. 80, 's Gravenhage, 1951.

The following aspects are dealt with: determination of purity, moisture content, germination, seed vitality and amount and type of seed-borne disease. Particulars are given of the seed-testing practices used for all the principal field, herbage and horticultural crops grown in the Netherlands. —P.J.B.

991 Casida, J. E. and Allen, T. C. **Criteria for evaluating insecticidal phytotoxicity—root growth.** *J. econ. Entomol.* 1951, **44**, 741-6, bibl. 19. [Wisconsin Univ., Madison]

A standardized laboratory procedure for evaluating the phytotoxic effects of insecticides on roots is described. The method utilizes cucumber roots. Evidence of the mode of the phytotoxic action of DDT is presented.—P.J.B.

992 Mueller, H. Fungizide. [**Fungicides.**] *Biol. Zentralanst. Land- und Forstw., Berlin-Dahlem* Festschrift, 1949, 200-8.

This is an historical account, going back to 1755, of the use of chemicals for protecting seeds and crops from fungal attack. [From *Herb. Abstr.*]—D.B.

993 Mueller, H. Prüfung von Pflanzenschutzgeräten. [**Testing of plant protection appliances.**] *Biol. Zentralanst. Land- und Forstw., Berlin-Dahlem* Festschrift, 1949, 219-22.

A general account is given of the various appliances used for cauterizing, spraying and dusting seed in plant protection practices. [From *Herb. Abstr.*]—D.B.

994 Finnegan, P. H. **Plant mounting in plastic.** *Agron. J.* 1951, **43**, 618-19. [Washington State Coll., Pullman]

A description is given of the use of polyester resins for mounting plant specimens.—P.J.B.

995 Youngman, Barbara J. **Germination of old seeds.** *Kew Bull.* 1951, No. 3, 423-6, bibl. 8.

Following a description of experiments made by several workers for testing seed longevity, it is maintained that further investigations are required on storage conditions which determine percentage germination of seeds. From an agricultural aspect this is more important than are records of old seeds that are viable after a hundred or more years.—M.H.

996 Howard, H. W. **Crops and plant breeding.** *J. roy. agric. Soc.* 1951, **112**, 84-95, bibl. 22. [Plant Breed. Inst., School Agric., Cambridge]

This is a review article summarizing published information from 22 sources on the breeding of wheat, rye, oats, potatoes, herbage legumes and grasses. Information is also given on legislation for the qualitative control of seeds and selective weed control with herbicides. [From *Herb. Abstr.*]—K.L.

997 WRIGHT, S. J. **Farm implements and machinery.** *J. roy. agric. Soc.* 1951, **112**, 109-22, bibl. 39. [The Croft, Great Warley, Essex]

This is a review article summarizing published in
formation from 39 sources on general farm mechan
ization, tractors, machines for cultivation, forag
conservation, grain harvesting, drying and storage
and the mechanization of root-crop cultivation
[From *Fld Crop Abstr.*]—K.L.

REVIEWS AND REPORTS

REVIEWS

998 RATHER, H. C. and HARRISON, C. M. **Field crops.** 2nd edition, pp. ix + 446, bibl., illus., New York and London; McGraw Hill, 1951, 24 × 16, $5.50 or 47s.

The first edition of this book, which is intended primarily for USA students taking their first course in farm crops, was reviewed in *Herb. Abstr.* 13: 1983. This 2nd edition attempts to eliminate what is now outmoded and to bring up-to-date as far as possible the information on crop varieties and the data on yields, acreages, prices, etc. A further selection of review questions is appended to each chapter and new illustrations have been substituted for some of the old. In general layout this 2nd edition follows the first. Three opening chapters on the significance, classification and management of farm crops are followed by two others on soil conservation and management, and tillage and cultivation. Then follow seven related chapters on forage legumes, perennial grasses, annual forage crops, haymaking, silage, pasture management, and the production of forage seed. Ten chapters follow on corn (maize), wheat and rye, oats and barley, miscellaneous grain and seed crops, harvesting small grain and seed, legumes, potatoes and sweet potatoes, sugar crops, cotton, and tobacco. The final chapter is devoted to crop improvement, mainly by plant breeding.

The book is strictly American in outlook and application and its authors appear not to have looked far outside the USA when compiling their information, thus limiting their field enormously. This is illustrated in the bibliographies given at the end of each chapter which consist almost entirely of references to USA literature. One looks in vain for references to works published in languages other than English.—A.G.G. HILL.

999 UNITED STATES Department of Agriculture. Yearbook of Agriculture 1950-1951. **Crops in peace and war.** pp. xviii + 942, illus., Washington; U.S. Govt Printing Office, 1951, 23 × 15, $2.50.

For almost a 100 years the yearbooks and annual reports of the USDA have provided American farmers with the knowledge of how to produce more from their land. This latest yearbook extends
that purpose, its main theme being the utilizatio
of farm products in peace and war, the war re
ferred to being World War II. This impressiv
volume is crammed with valuable information o
the processing, storage and utilization of agricul
tural products, and is the kind of book of which th
reviewer stood in great need 10 years ago, whe
organizing *ad hoc* wartime research in the tropic
with the main object of developing local sub
stitutes for imports. There are over a 100 signe
articles in the book and as each one is self-containe
and self-explanatory the result is that a certai
amount of repetition occurs. There is an excellen
glossary of scientific terms, as well as a combine
subject and author index.—A. G. G. Hill.

1000 UNITED STATES Department of Agricultur
Agric. Monogr. 5. **A survey of Soviet Russia**
agriculture. By *L. Volin.* pp. 194, bib
in text, subject index pp. 189-94, Washing
ton, 1951, 23 × 15, 45 cents.

The work is in eleven parts and gives informatio
on: the country and its climate, agricultural polic
and land tenure, the farm system and farmin
practices, the policy of government supervisio
land utilization and the production of crops (class
fied as grains and non-grains). There is also muc
information compiled from various Russian stati
tical publications which are listed separately, wi
the names of the issuing agencies. Among the fir
measures adopted in the Soviet Union to increa
agricultural production was the expansion of th
area under sown crops. Results from this we
contrary to expectations. The low yields obtain
have been attributed partly to the lack of fertilit
in soils of newly developed regions; but they m
be due chiefly to the destruction of initiative a
enthusiasm in the farmers by controls and ove
centralization. Decrees have been modified or co
pletely annulled by counter-measures, withou
however achieving the desired ends. The lat
measures enforced have been designed to contr
weeds (a major problem after World War 2),
modify the system of sowings (delayed cropping
and to vary the rotations in the dry regions (om
sion of the herbage break in order to conser
moisture). It is stated that in spite of [or perha
because of] the intricate system of measures e
forced to improve production and distribution

he agricultural industry, outstanding achievements n regard to greater productivity and better living tandards for the population have yet to be realized.—M.HALL.

001 SPAIN. Ministerio de Agricultura. España, país agrícola, ganadero y forestal. [**Spain, its agriculture, animal husbandry and forestry.**] pp. 180, chromopl., 1951, 31 × 23. [Spanish, French and English]

his richly illustrated book gives an account of gricultural production in Spain. It has sections hich present in English an outline of the geography and natural plant cover of the country, the rops, ranging from tropical plants to those of emperate climates, the woodlands, the animal usbandry, agricultural industries, and the organzation of the Ministry of Agriculture, agricultural ducation, research, land survey and settlement.—.M.ROSEVEARE.

002 PANTANELLI, E. Problemi agronomici del Mezzogiorno. [**Agronomical problems in southern Italy.**] 2nd ed., pp. 334, illus., Bologna; Ed. agric., 1950, 24 × 17, Ital. lire 1600.

he author, an authority on agriculture in a warmrid climate, has summarized his 50 years' experence in this valuable book, which is intended to erve as a guide in any attempt to transform agriulture in the particular conditions which exist in outhern Italy. The matter is treated clearly and imply under the following heads: climate, land eclamation, arid cultivation, intensive cereal culivation, renovating crops, improvement of crop otations, irrigation, gradual transformation and stablishment of farms. Compared with the first dition, which appeared 15 years ago, many dditions, mainly illustrating recent advances in gricultural technique in Italy, have been made to his new edition. New illustrations have been dded, but the author and subject indexes have een omitted. A total of about 340 bibliographical otes is given.—E. BIASUTTI OWEN.

003 EVANS, T. W. **Land potential.** With a foreword by Sir R. George Stapledon. pp. 144, London; Faber and Faber Ltd., 1951, 21 × 14, 12s. 6d.

he author suggests a formula for measuring the otential of any farm. The basic reasons for hoosing this formula, its strength and its weakesses and how it works in practice are set out. The asic formula is a measure of whether a holding is eing farmed under, at, or above, its best long-term hysical productivity. It runs thus:—

$$\text{Land Production Index} = \frac{100P(C + T - F)}{A}$$

where P = the land potential i.e., the acreage required to produce one unit of food. C = food units used for stock maintenance and/or the sale of stock and stock products. T = food units sold in the form of cash crops. F = the number of food units purchased annually and A = the acreage of the farm.

The land potential value (P) assigned to any farm is obviously all-important as any changes or error in its assessment are multiplied by both 100 and the product of C + T — F.

The value of P is derived from a table on page 72 which shows changes in sustained oat yields linked with changes in annual average rainfall. In the first example in Chapter 9 the Land Production Index is calculated to be 101. This is based on a sustained oat yield of 30 cwt. per acre. Yet, if the correct oat yield on that farm had been assessed at 35 cwt. per acre, the Index would drop to 84. Thus an error or disagreement in the estimation of the oat yield of 5 cwt. brings the production of this farm from satisfactory to well below its potential. The author states that " a good farmer can always estimate how much oats his land is capable of sustaining and will assess the potential yield to within two or three cwt. per acre." Many readers may feel that in their experience such estimation is much more hazardous than this. Inherent yields can be camouflaged by variations in weather and in rotations, by different and indifferent cultivations, by manurial practice and the continued improvements in oat varieties and the spread of knowledge of their differences.

To prevent the feeling that this factor P might prove in practice to be the Achilles heel of the whole formula, it would have been better if Dr. Evans had devoted more space to an explanation and defence of it. Again, what allowance is made for rough grazings in A—the acreage of the farm?

It is to be hoped that this book hurries through its first edition into its second. The basic idea is a fascinating one and, as it has been proved on 200 farms, there must be satisfactory answers to the queries raised.—From review by G. P. Wibberley in *J. Brit. Grassl. Soc.* 1951, 6, p. 185.

1004 ENGLAND and WALES. Ministry of Agriculture and Fisheries. Bull. No. 150. **Wild mammals and the land.** By *F. Howard Lancum.* pp. 60, illus., London; H.M. Stationery Office, 1951, 2s. 6d.

Like its companion publication, Bulletin 140, *Wild birds and the land,* published in 1948, this bulletin on mammals is written by F. Howard Lancum, being based on an earlier and more comprehensive work by the author, but it also contains certain additional information, notably a list of foods eaten by the various mammals described. Although the feeding habits of our wild mammals is no less important than those of our birds, much less study has been given to them. While some of the mammals are beneficial and deserve protection, others are known to be amongst the worst of farm pests and so must be pursued and destroyed relentlessly, even though the task of controlling them is one of great difficulty and only to be achieved by careful study of animal habits. The main purpose of this bulletin is to describe the habits of the more important wild mammals and, by examining them, to discover which are beneficial, and which harmful. After dealing with the fox, badger, otter, hedgehog, rabbit, hare, squirrel, pine marten, polecat, stoat, weasel, rat, mole, shrew, vole and mouse in turn, the bulletin ends with a summary of conclusions in which the harm and the good done by each is briefly mentioned. The villains of the piece are, of course, the brown rat and the rabbit. Our present acute food situation demands that everything possible should be done to keep these two pests in check. Methods of destruction or control are not described at any length, but details of these methods are obtainable in other publications of the Ministry.

As in the case of the bird bulletin, this publication is not confined to economic aspects, but also contains much that will interest the naturalist. The 39 photographic illustrations are excellent.—A. G. G. Hill.

1005 Ahlgren, G. H., Klingman, G. S. and Wolf, D. E. **Principles of weed control.** pp. 368, bibl. 433, illus., N. York ; John Wiley : London ; Chapman and Hall, 1951, 22 × 14, 44s.

Although written primarily as a text book, the *Principles of Weed Control* in fact constitutes an extremely valuable review of the work carried out on herbicides in the United States of America. The book is divided into three main sections : the properties of herbicides ; weed control and a consideration of the effects of individual herbicides on specific crops ; and a study of the control of certain poisonous and particularly noxious weeds. There are additional chapters on soil sterilants, defoliation, and application equipment. A list of the relative susceptibility of plants to 2,4-D and a very useful set of conversion tables are provided in appendices. The authors' habit of giving the botanical names to some weeds and not to others is vaguely irritating ; for instance the reviewer had to resort to a botanical reference book to learn that skunk cabbage rejoices in the name of *Symplocarpus foetidus*. It is stated that occasional reports indicate that weedy plants increase in palatability [to stock], when sprayed with 2,4-D. This, however, is not supported by any bibliographical reference, an unusual occurence in this book, although one case is quoted to show that 2,4-D did not increase the palatability of a brome-grass/alfalfa mixture. From this single example it is deduced that spraying of 2,4-D will not increase the palatability of forage grasses, a conclusion which is surely overstretching the facts. With three exceptions, the references are all to U.S. work and literature, and the problems considered are specific to the USA. Nevertheless, most of the work has a direct bearing on problems which also occur elsewhere, and this book is recommended to all who have to deal with weed control, both practical and theoretical. It is a pleasure to note the emphasis placed on good husbandry in a work which is primarily chemical.—N. G. SHREEVE.

1006 International Union of Biological Sciences. Colloquia, Series B, No. 1. **Trace elements in plant physiology.** pp. xix + 144, pl. 10, Waltham, Mass. ; Chronica Botanica Co. : London ; Wm. Dawson, 1950, 24 × 16, $4.50.

This report of the symposium on trace elements, held in 1947 at the Rothamsted Experimental Station, is described by the publishers as " the first and only account on this subject in book form." It includes detailed information about war-time and post-war advances in knowledge of the role of trace elements. The publication consists of a summary of the papers by Professor T. Wallace, a foreword by Dr. M. J. Sirks, the opening address by the Chairman, Professor B. Němec of Prague, and 14 papers. One of these papers by D. I. Arnon (California), is a short memorandum on nomenclature in English-speaking countries. The word " micronutrient " is recommended to replace the less satisfactory trace, minor or rare element. Three papers deal primarily with methods used in the diagnosis of the mineral status of plants and in the growing of plants in cultures for fundamental studies. These are : the application of the method of visual diagnosis to trace element problems in plants (T. Wallace, Long Ashton, England) ; large-scale sand culture methods for the study of trace-element nutrition of plants (E. J. Hewitt, Long Ashton) ; and criteria of essentiality of inorganic micronutrients for plants with special reference to molybdenum (D. I. Arnon). Four papers focus attention on the functions of trace elements in the metabolic processes of plants. They are : importance of copper and molybdenum in the nutrition of higher plants and micro-organisms (E. G. Mulder, Netherlands) ; the activity and interdependence of nutrients in the nutrition of *Aspergillus niger* [in French] (J. Lavollay, Paris) ; the effect of copper and manganese on the iron status of higher plants (J. Erkama, Finland) ; and the action of manganese on roots (H. Burström, Sweden). Trace-element problems in crops occurring in European countries were discussed in the following papers : deficiencies of minor elements caused by excesses [of other nutrients such as lime] (L. Gisiger, Switzerland) ; investigations on microelements from a practical point of view (F. Steenberg, Denmark) ; injury through excess of manganese (M. P. Löhnis, Netherlands) ; zinc deiciency of fruit trees in Europe (D. Mulder, Netherands) ; and the rôle of trace elements in the agriculture of Finland (E. A. Jamalainen). A paper on he trace-element problems of farm stock entitled ' Mode of action and occurrence of trace elements n pastures and in the blood and liver of farm nimals " was given by L. Seekles (Netherlands). Commenting on this paper, Professor Wallace wrote : " The similarity of the patterns of the problems in plants and animals were obvious . . . . The need for collaboration between plant and nimal physiologists, to whom may also be added soil scientists and climatologists, is now well recognised, and this co-ordination is of vital necessity o ensure the progress that is needed to increase he world supplies of food sufficiently fast to meet he needs of the rapidly expanding world populaion."—D.BROWN.

007 ELLIOTT, Charlotte. **Manual of bacterial plant pathogens.** 2nd revised edition, pp. viii + 186, fig. 6, Waltham, Mass. ; The Chronica Botanica Co. : London ; Wm. Dawson and Sons, Ltd., 1951, 27 × 18, $6.

'art I of this entirely revised edition [*Rev. appl. Mycol.*, 10, p. 120] brings up to date all available nformation on the synonyms, cultural, morhological, and physiological characteristics, sympoms, geographical distribution, control measures, nd important literature citations for the bacteria ausing plant diseases. The nomenclature follows argely that of the 1948 edition of Bergey's Manual *ibid.*, 28, p. 512]. Part II includes descriptions of acteria reported on plants in the literature but not ecognized as valid plant pathogens. There are inlexes to the genera and species of both plant hosts nd the bacteria.—From *Rev. appl. Mycol.*

008 GREAT BRITAIN. Agricultural Research Council. **Index of agricultural research in progress, 1951.** pp. 53, London ; H.M. Stationery Office, 1951, 3s. 6d.

Until the appearance of this publication, there has een no comprehensive list of the agricultural reearch work in progress in Great Britain. This list ives, in condensed form, the following information: classified subject index bringing together related ubjects in the main scientific fields of enquiry ; nd secondly, animal and crop indexes showing the fforts directed towards improving production of pecific crops and different classes of livestock. he contents of these indexes refer mainly to reearch work included in the programmes of the gricultural research institutes or organizations irectly under the Agricultural Research Council. Vork in university departments is included only if ssisted by research grants from the Council or from he Ministry of Agriculture and Fisheries. Unfortunately, the list omits the investigations being carried out by : the Veterinary Laboratory of the Ministry of Agriculture and Fisheries, Weybridge ; the National Institute of Agricultural Botany, Cambridge ; the experimental husbandry farms and horticultural stations ; the National Agricultural Advisory Service in the counties ; and the agricultural colleges in Scotland. However, it is planned to remedy these omissions in subsequent editions of this Index.

The work of research institutes concerned with crop husbandry will be found under several headings, viz. agricultural engineering, fertilizers, plant breeding, plant pathology, plant pests, plant physiology and soils. Reference may also be made to specific crops in the Crop Index.

The organization and administration of agricultural research in Great Britain will be described in a publication shortly to appear, entitled *The Agricultural Research Service.* The same publication will also contain notes of all the research institutes and units, whether financed directly by the Agricultural Research Council or by the Ministry of Agriculture and Fisheries and the Department of Agriculture for Scotland. [See also the following notice of research work in progress in British Universities.]—A. G. G. HILL.

1009 GREAT BRITAIN. Department of Scientific and Industrial Research. **Scientific Research in British Universities 1950/51.** pp. 459, limited circulation, 1951, 20 × 17.

The object of this volume is to provide brief notes outlining the projects [including agricultural research] being undertaken by research teams in scientific departments of British universities and university colleges during 1950/51. It has been compiled by the British Council and issued by the Department of Scientific and Industrial Research, with the collaboration of the Agricultural and Medical Research Councils, and is on the same lines as the volume for 1949/50. Where university departments house units of either the Agricultural or Medical and Research Councils, a note has been appended giving a list of personnel employed. It is hoped to publish the next edition.—From Foreword.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated by giving a reference to the abstract.

1010 **Rome,** Food and Agriculture Organization of the United Nations. The work of FAO

1950/51. Report of the Director-General. No. C51/21, Rome 1951, pp. 67.

The year was a difficult one for the Organization and its staff because of the removal of the headquarters from Washington to Rome. Despite these difficulties, the year marked a turning point towards greater achievement. The major activities of FAO, explained in the 1948/49 report, continued, but recent developments have led to some change of emphasis. This 1950/51 report concentrates on the practical assistance rendered to member countries and surveys the field of FAO's activities by regions and countries, describing the work done: to improve nutrition, to encourage the wise use and conservation of land, to reduce or eliminate animal and plant diseases, to save grain and other crops, to introduce modern methods of production, and to help governments to improve their statistical and other technical systems. After reviewing the various measures adopted in the world war against want and describing how the campaign is carried on, the report goes on to discuss the projects and programmes organized by FAO in different regions, and the individual countries within these regions. Next follows an account of those FAO activities which are carried out on a world-wide basis. A list of FAO publications issued in 1950/51 is included.—A.G.G.H.

1011 **Netherlands.** Instituut voor Rationele Suikerproductie. Rapport van de Commissie ter Bevordering der Suikerbietenteelt in de Noordelijke Provinciën over 1950. [Annual Report of the Commission for Promoting the Cultivation of Sugar-beet in the Northern Provinces, 1950.] Bergen op Zoom, 1951, pp. 52.

INVESTIGATIONS REPORTED:

1. Plant spacing trials. By W. J. Bokje, pp. 18-21. Trials were laid down to investigate the effect on root and sugar yields of different plant spacings arranged to give the same number of plants per ha. Row spacings varied from 50 × 45 and 40 × 55 cm. giving 45,000 plants per ha., up to 50 × 27 and 40 × 33 cm. giving 75,000 plants per ha. There were no significant differences in root yield between any of the plant spacings, though where the spacing was widest, there was a tendency to higher yields and lower sugar content. Tare percentages were highest at the closest spacing.
2. Trials with green manuring for sugar-beet. By R. E. Westerhuis, pp. 21-2. These trials are in progress.
3. The effect on sugar yield of leaving topped sugar-beet in the ground before lifting. By P. Lindenbergh, pp. 22-32. [See Abs. 334.]
4. Losses following lifting sugar-beet. By P. Rozema, pp. 32-4. Comparisons were made of root-weight and sugar-content losses in lifted and topped sugar-beet left on the field for different periods from 13 November to 11 December. The losses in heaps covered with leaves, and uncovered, were much the same, being about 1% in sugar content, while the weight of individual roots changed only slightly.
5. The effect of injury to sugar-beet leaves. By T. Roetcisoender, pp. 34-6. [See Abs. 845.]—P.J.B.

1012 **Netherlands.** Central Institute of Agricultural Research (Centraal Instituut voor Landbouwkundig Onderzoek). Report for 1949. Wageningen, 1949, pp. 148. [Dutch]

INVESTIGATIONS REPORTED:

1. Comparison of some fodders grown as the main crop on light sandy soil. By J. C. Bosman, pp. 75-7. In 1948, 13 trials were made comparing fodder potatoes, kohlrabi and maize with fodder-beet. Determination of dry-matter content and yield of starch equivalents showed kohlrabi unable to compete as a provider of starch equivalent. No data are available for the maize. In soils where fodder-beet is not so successful, potatoes should be given preference.
2. Drill widths in sowing turnips. By J. C. Bosman, pp. 77-80. A pilot trial shows that increasing the drill width from 20 or 25 cm. to 30 or 40 cm. does not prejudice the yield of turnips, while weed growth is more easily controlled and harvesting time is shortened by means of wider drills.
3. Study of the high yields of wheat obtained in 1949 in comparison with previous years. By W. H. van Dobben, pp. 80-9. Conditions which can greatly depress wheat yield are lack of sunshine in the period 20 March to 10 May, too much heat in the third decade of June, and much rainfall in the period 10 June to 20 July. The year 1949 was unusually favourable in respect of these 3 conditions. The possibility of selection for resistance to unfavourable weather conditions is discussed.
4. Maize varietal and cultural trials. By W. R. Becker, pp. 89-93. The trials included the use of various herbicides.
5. The vitamin C content of potatoes, with special reference to early potatoes. By A. J. Reestman, pp. 93-6. Little or no difference in winter and spring was perceptible between the varieties studied for vitamin C content.
6. Varietal trials of flax for fibre. By J. C. Friederich, pp. 96-8.
7. Chemical control of weeds in fibre and oil flax. By J. C. Friederich, pp. 98-100. Information is given on the effects of various herbicides and on optimal weather conditions and time of application.
8. Second year's results of oil flax trials. By J. C. Friederich, pp. 100-2. Information is given on manuring, cultural technique, varietal performance and selection work.
9. Cold requirements and response to day length in seed production. By A. F. Schoorel, pp. 105-8.

The responses of different plants grown in the Netherlands are briefly discussed.

10. The keeping qualities of seed potatoes. By W. H. de Jong, pp. 108-13, illus. Seed potatoes were stored in sacks and boxes, a count being made of those which rotted: in addition year-old tubers were planted in August, the subsequent plant stand furnishing a measure of keeping capacity.

11. The effect of light of varying duration on sprouting and greening in potatoes. By N. Krijthe, pp. 113-17. Yellow and green light play a relatively small part in inhibiting sprouting in potatoes. Infra-red of very slight intensity can inhibit sprouting, red to the same degree, blue and violet probably somewhat less. Greening of the tuber in light is caused principally by red light and somewhat less by yellow and green. Blue and violet cause little greening and infra-red none.

12. Potato rot during storage. By J. C. Mooi, pp. 117-19. *Fusarium coeruleum* is the principal cause of rot in stored potatoes in the Netherlands, *F. avenaceum* is of less importance. Varietal differences in susceptibility are distinguished. Trials with the fungicide Fusarex are described: growth of the fungus and sprouting were effectively hindered.

13. Control of weeds in cereals. By H. J. Eggink, pp. 119-22. Trials of different herbicides are briefly reviewed from the viewpoint of potential damage to the crops. Special attention is paid to the time of application. At determined periods all the cereals can well tolerate treatment with herbicides and the use of growth substances need not depress yield.

14. Studies of quality. By A. Veenbaas and others. pp. 122-3. A short note on varietal studies of quality in potatoes, pulses and barley, and on the influence of external conditions.

15. Influence of storage methods on the taste of potatoes. By A. Veenbaas, pp. 126-7.

16. Effect of nitrogenous fertilizers on the consumption quality of early potatoes. By A. Veenbaas, p. 128. Raising or lowering the normal dose of N by 40 kg. per ha. appeared to have very little effect on quality, both in 1948 and 1949.

17. The nitrate content of plant samples. By W. B. Deijs and M. S. M. Bosman, pp. 134-7, bibl. 7. Discussion of analytical technique and description of a simplified, colorimetric method for determining nitrate content, evolved by the authors. The material included lucerne, spinach, green oats, oatmeal, and potato leaf.

8. Induction of flowering and seed formation in varieties of *Helianthus tuberosus*. By H. L. van de Sande Bakhuyzen and H. G. Wittenrood, pp. 137-3, illus. Experiments in grafting on sunflower and in short-day treatment.

19. Chilling experiment, 1948-1949, to determine degree of cold resistance in wheat and rye varieties. By H. G. Wittenrood, pp. 143-4.—G.M.R.

1013 **Netherlands.** Central Institute of Agricultural Research. (Centraal Instituut voor Landbouwkundig Onderzoek.) Report for 1950. Wageningen, 1950, pp. 182. [Dutch, with English summaries] [Received 1951]

INVESTIGATIONS REPORTED:

1. Weed vegetation of arable lands. By K. J. Zandstra and D. M. de Vries, pp. 30-3. Old arable land on sandy soil was surveyed and the weed population recorded on a 7-degree scale, findings being related to soil fertility, pH value etc. Specific frequency was also studied from 0.5 sq. m. readings distributed equally over the field.

2. Protein content of sugar-beet, fodder-beet and mangolds. By J. C. Bosman and W. A. P. Bakermans, pp. 74-9, bibl. 4. Within a given type, the percentage crude protein in the dry matter and digestible crude protein in fresh material decrease with increasing dry-matter content. Environmental conditions, especially soil, have much influence. There is no reason, however, in view of this relationship, to prefer the growing of fodder-beets with a low percentage dry matter to beets with a higher dry-matter content.

3. Straw characters of spring cereals at 3 sowing dates, with a reference to crop analysis. By W. H. van Dobben, pp. 79-87, bibl. 4.

4. Chemical composition, yield and lodging of winter rye and winter wheat with very high nitrogen applications. By W. H. van Dobben. pp. 87-93. Very high applications of N give in some cases yield depressions without lodging. The possible origin of both yield depression and lodging in nutritional disturbance is investigated, with special reference to potassium.

5. Trial of two growth-stimulating seed dressings. By W. H. van Dobben and R. F. Hoogland, pp. 93-4. Phytergine, a French liquid preparation, and Porro, an Austrian dust, were tested for the treatment of oats, barley and wheat, with no effect.

6. Maize varietal and spacing trials. By W. R. Becker, pp. 94-8. A population of 32,000 plants per acre was found to give the best yield and, with this population, it is of no importance whether the drills are 24, 30 or 40 in. apart.

7. Linseed varietal and cultural trials. By J. C. Friederich, pp. 98-102. Varieties from all parts of the world were tested in different soils and localities in comparison with the Danish Daehnefeldt 369. The seed yield of several of the new varieties exceeded that of the standard. Some conclusions on cultural methods are drawn.

8. Chemical herbicides in fibre and oil flax cultures. By J. C. Friederich, pp. 102-5. Flax is far more liable to damage from herbicides than are cereals, and even selective chemicals should be used only in emergency. The results of experiments with different herbicides are tabulated.

9. Fibre flax varietal and cultural trials. By J. C. Friederich, pp. 105-9. The behaviour of different

varieties in regard to yield, germination, resistance to rust and scorch, and time of sowing is recorded. A heavy application of nitrogen results in more lodging, greater susceptibility to rust, and poorer quality straw and fibre. Commercial preparations containing tetramethyl thiuram disulphide are more effective than organo-mercury dusts as seed disinfectants.

10. Storage of seed beets. By A. F. Schoorel, pp. 109-13, illus. Of the 5 methods tested, the best was storage without leaves in a clamp having a fan supplying cold air from outside and drainpipe for air outlet.

11. How long can seed potatoes be kept ? By W. H. de Jong and D. Hofstra, pp. 113-18. Within one variety, tubers of the 1947 crop planted in the spring of 1949 gave the same total yield as those from the 1948 crop, but the older tubers produced plants with a larger number of stems and with more and smaller tubers than did the younger seed. Few of the 1947 crop survived until 1950. Trials of tubers over one year-old from several different varieties gave satisfactory results in some cases and poor results in others.

12. Weed control experiments in peas. By H. J. Eggink, pp. 118-20. The comparative value of calcium cyanamide and calcium cyanamide + dinitro-sec. butylphenate (DNSBP), which both gave good results, is discussed.

13. Stages of growth in which cereals are susceptible to herbicides. By H. J. Eggink and P. Riepma Kzn, pp. 121-8. Conclusions derived from spraying winter wheat, winter rye, and spring-sown oats, barley and wheat at different stages of development with DNC, MCPA, and 2,4-D are recorded.

14. Weed control in maize. By H. J. Eggink and W. R. Becker, pp. 128-30. DNC can be used from maize emergence until the crop is 12 in. high, MCPA when the maize plant has formed 2 leaves and until it is 12 in. high. 2,4-D is slightly less liable to damage maize than MCPA, and can be used under the same conditions.

15. Starch from green peas. By W. B. Deijs and M. S. M. Bosman, pp. 144-7, bibl. 11. Starch preparations were isolated from 6 varieties of peas and 2 varieties of potatoes. Starch from wrinkled peas contained 62-75 % amylose, starch from round-seeded peas and fresh potatoes about 30% amylose. There was a good correlation between the amylose content and the optical density of the iodine complex. Amylose content in starch from peas can be determined by a simple colorimetric method.

16. Flower initiation, seed and tuber formation in different clones of *Helianthus tuberosus*. By H. L. van de Sande Bakhuyzen and H. G. Wittenrood, pp. 154-60, illus. Experiments with short-day and auxin treatment.

17. Drying and storage of flax seed. By J. J. I. Sprenger, pp. 171-6. For export, the moisture content of flax seed should not exceed 10 %. Early harvested flax seed with a moisture content of 10 % can be kept at 72.5 °F. for 8 to 16 weeks; for longer storage periods a moisture content of 8 to 9 % is recommended. If the moisture content of the seed is 10 %, the temperature whilst drying should not exceed 120 °F. if germination capacity is to remain uninjured.—G.M.R.

1014 **Switzerland.** Bericht über die Tätigkeit der Eidg. Landwirtschaftlichen Versuchsanstalt, Zürich-Oerlikon, pro 1949/50. [Report of activities of the Federal Agricultural Experiment Station, Zürich-Oerlikon, for 1949/50.] *Landw. Jb. Schw.* 1951, **65**, 461-532.

INVESTIGATIONS REPORTED :

1. Seed testing. By E. Frey, pp. 478-99. About 12,000 seed samples of legumes, grasses, root crops and cereals were tested for purity and germination capacity. Results are tabulated.

2. Trials with fodder grain. By M. Buchli, pp. 506-7. Varieties of winter and summer barley and winter and summer oats from various sources have been cultivated at various altitudes. Good grain yields were obtained from the Aberystwyth oat strains S 147 and S 172 when grown in the Rhine valley in the St. Gall region and at Reckenholz. Their winterhardiness and susceptibility to *Oscinis frit* have not yet been finally established. Damage by frit fly is one of the greatest problems in the cultivation of oats. In the alps, the maintenance and extension of the area of oat cultivation depend almost entirely on the successful control of the frit fly.

3. Special crops. By M. Buchli, p. 511. This small section is concerned with rape and more particularly with the selection of varieties having pods resistant to bursting.

4. Fungicidal cauterizing agents. By H. Zogg, pp. 517-20. Tables and graphs show the effect of these agents in the control of *Tilletia tritici* in wheat and root rot in sugar-beet.

5. Herbicides. By H. Zogg, pp. 520-1. Preparations for the control of weeds in cereal crops and meadows.

6. Insecticides and preparations for control of other pests. By E. Horber, pp. 522-6. Tables give results of experiments for control of cockchafer, wireworm, moles, mice, and grain-eating birds.

7. Pest control trials. By E. Horber, pp. 526-31. These include the following: (a) the occurrence of the yellow cereal-stalk fly (*Chlorops pumilionis*) at high altitudes in Switzerland [*Fld Crop Abstr.* 5: 110]; (b) susceptibility of oat varieties to frit fly; and (c) the use of a sleep-inducing drug Corbodor, in which chloralose is the active principle, for trapping crows and pigeons which are then collected and killed.—D.B.

1015 **Italy.** Bari, Stazione Agraria Sperimentale. Relazione sull' attività del triennio 1948-50. [Report on 3 years' work, 1948-50.] Bari, 1951, pp. 73.

This is the first periodical report published since 1943.

INVESTIGATIONS REPORTED :

1. Wheat, pp. 26-9, 39-41 and 48-55. Selection, introduction and multiplication of varieties adapted to Puglia and Lucania. Varietal yield trials. In a trial carried out to establish the best date and rate of sowing, Precoce 2588 and Maiorica 47, both sown not later than 25 November, at a seed rate not exceeding 170 kg./ha., gave the best results. In a trial of indirect manuring of wheat, an increase in the grain yield was obtained by applying 4 q. of superphosphate to the preceding fodder crop and 1.5 q. of ammonium nitrate per ha. as a top dressing to the wheat.
2. Barley, pp. 29-30. The variety 002, two-rowed, with adherent paleae, was obtained by selection. In varietal trails the variety Early from England yielded 29 q./ha.
3. Oats, p. 30. Varietal trial.
4. Maize, pp. 31, 42-7 and 56-7. Trials with different hybrids grown with and without irrigation.
5. Pulses, pp. 33-4. Selection continued with *Vicia faba*, *Cicer arietinum* and *Lathyrus sativus*. A trial, in which calcium nitrate was given to a *Vicia faba* crop, showed an increase in yield both from *Vicia faba* and the wheat crop which followed.
6. Potato, pp. 34-5. Preliminary varietal yield trials were carried out.
7. Flax, p. 35. Trials with varieties for seed and fibre.
8. The herbicide 2,4-D controlled species of *Calendula*, *Cirsium*, *Sonchus*, *Diplotaxis*, *Brassica*, *Urtica*, *Allium*, *Mercurialis*, *Malva*, *Medicago*, *Papaver*, *Stellaria*, *Convolvulus*, etc., p. 36.
9. Aumentan and Porro increased the yield of grain and straw of several wheat varieties, p. 36-7.
10. Ultra-violet ray treatment of seed increased the yield of 3 soft-wheat varieties and depressed the yield of 3 hard-wheat varieties, pp. 37-8.
11. Section of Agricultural Ecology and Biostatistics of the Station, programme of work, pp. 67-8.
12. Plant Pathology Observatory, account of work, pp. 70-2. Control of the pests *Dociostaurus maroccanus* and field mice.—E.B.O.

1016 **Cyprus.** Quarterly Review No. 25. July-September, 1951. Nicosia, 1951, pp. 29.

INVESTIGATIONS REPORTED :

1. Wheat variety trials, pp. 10-12, 25-6. Brief notes are given on the performance of 14 varieties. Kyperounda was a heavy yielder, but very susceptible to stem rust (*Puccinia graminis*). Ca23 was a good yielder, more resistant to stem rust, but more susceptible to brown and yellow rusts (*P. triticina* and *P. glumarum*).
2. Barley variety trials, p. 12 and 27. Brief notes are given on the performance of the varieties Cyprus Black, Paphitico, Beladi and B.M.C.
3. Sowing date of wheat, pp. 12-13. In a 2 × 4 factorial trial with the varieties Psathas and Kyperounda, significantly better yields were obtained from sowings on 3, 16 and 30 Dec. than from wheat sown on 13 Jan. Kyperounda gave significantly higher yields than Psathas.
4. Potato trials, pp. 13 and 28-9. In trials with 12 varieties, Up-to-date gave the highest yield. In a 3 × 3 factorial date-of-lifting trial with 4 replications using Arran Banner, Arran Pilot and Vanguard, it was found that Arran Pilot is as suitable as Arran Banner for early lifting, although it does not produce so heavy a crop at the end of the season.
5. Sorghum trials, pp. 13-14. Observations are given on trials with 7 US sorghum varieties.
6. Weed control, pp. 14-15. Shell weedkiller 7A was tested against *Paliurus australis*, *Cynodon dactylon*, *Sorghum halepense* and *Prosopis stephaniana* and found to give no lasting results. Pentachlorophenol gave similar disappointing results when used on *Paliurus australis*—N.G.S.

1017 **South Africa.** Annual Report of the Department of Agriculture for the year ended 31st August 1951. *Fmg S. Afr.* 1951, **26**, 395-528.

[See *Fld Crop Abstr.* 5 : 327.]

INVESTIGATIONS REPORTED :

1. Fertilizer and spacing trials with maize, Bethlehem, p. 471. In weed-infested maize, spacings of 7 ft. between the rows gave yields equal to those from normal spacings of 3.5 ft.
2. Research on the breeding, manuring and storing of potatoes, Bethlehem, p. 471.
3. Maize varietal trials, Kroonstad, p. 471. The standard varieties Potchefstroom Pearl, American White Flint, Early King and Salisbury White were significantly outyielded by 9 white crosses. The A21 × B36 cross gave the highest yield of 36.28 bags per morgen. Standard varieties gave yields of approximately 25 bags [weight not stated] per morgen. [1 morgen = 2.1165 ac.]
4. Trials on oil-bearing crops, Kroonstad, and Potchefstroom p. 472. The Giant or Black Russian types of sunflower were high yielding when planted early. The dwarf varieties were useful for planting late in the season.
5. Varietal and time of sowing trials with wheat, Kroonstad, p. 472.
6. Rotational trials with lucerne, *Setaria* 1185 and potatoes in rotation, Dohne, p. 474.
7. Investigations on the influence of soil on the cultivation of sweet potatoes, Bathurst, p. 474.
8. Varietal trials on groundnuts, sunflower and kaffir corn, Towoomba, p. 475. In dry years the Natal Common type of groundnut far outyielded all

NEWS ITEMS AND NOTES

Great Britain

1027 AMERICAN PIGWEED. *Amaranthus retroflexus*, an annual, was first introduced from tropical America into North America, where it has become a serious weed on light land. The variety *rubricaulis* has red leaves, while the variety *delilei* has short, instead of long, bracteoles. *A. retroflexus* has been occasionally reported in Great Britain over a period of many years. It does not appear likely, however, that it will become a widespread weed in Great Britain, but evidence in Suffolk during the autumn of 1951, where it has been observed growing on several fields on light land, suggests that locally it can be very troublesome. It flowers in Britain from July to September, and is propagated by seed which is ripe by August and can germinate throughout the summer and autumn. Seed is found commonly as an adulteration in commercial seed. *A. retroflexus* can be suppressed by cutting before the seed is produced, but it is difficult to pull or cut when fully grown. When the seeds are embedded in the soil, they retain their viability for several years and germinate only when brought by cultivation to within about 2 in. of the surface. As this species is most frequent in root crops, cultivations, designed to control *Chenopodium album*, are likely to prove equally successful with *A. retroflexus*. Chemical control is considered of limited use since this weed is most frequent in crops which cannot be sprayed with herbicides. If sprayed early, it is likely to be controlled by oil sprays, growth regulators and by DNOC. (in litt.)—E.B.O.

1028 HILL FARMING ACT OF 1946. In the four and three-quarter years since the Act came into force, 4000 schemes affecting nearly 4800 holdings in England and Wales with an area of upwards of 1⅓rd million acres, excluding common grazings, have been approved or are under consideration. *World Crops* February, 1952.—C.L.S.

1029 "MORE FROM EVERY ACRE." An 8-page leaflet issued in February, 1952, by the Ministry of Agriculture and Fisheries briefly outlines the basic agricultural practices which should be followed if an increase in yields is to result from this year's cropping. Detailed advice is given on the growing of cereals and potatoes and on their timely and adequate manuring.—C.L.S.

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Italy

1031 A CORRECTIVE FOR CLAY SOILS. In Italy, from the lower Po Valley, southwards along the Apennines, to Sicily, there are more than 6 million ha. of clay soils with a varying degree of compactness, which, to a great extent, form desolate and eroded hills. The possibility of raising profitable crops on the these soils, which are generally of good fertility, diminishes as the degree of compactness increases. Flotal, a new preparation, consisting of an organic-mineral complex based on iron salts, has been under trial for several years and is said to be the best corrective for alkaline clay soils of which it modifies the physical structure. Flotal is a dark brown powder containing 30 to 32 % iron salts and has a pH value of 1.5 to 2.5. Applied to the soil at the rate of 5 to 20 q./ha. it causes the clay colloids to flocculate so that the uniform clay paste takes on a crumblike structure. In field trials, carried out on various clay soil types, the following results were reported:

Crop	Flotal q./ha.	Yields q./ha.	
		Control	Treated plots
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Denmark

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Rumania

1033 COTTON CULTIVATION. In 1935 cotton was grown on 700 ha. In 1945 the area devoted to this crop had in-nd others, p. 48. Five seedlings tested in 1950 howed marked resistance to these diseases.

. Control of aphids and leaf-roll spread. By G. W. impson and others, pp. 50-1. Eight weekly applica- ons of 1.88 lb. of wettable Toxaphene powder in 25 gal. of spray per ac. gave excellent aphid con- rol.

. Wireworm control. By J. H. Hawkins and A. . Getchell, pp. 53-4. Six to ten lb. per ac. of hlordane applied to the soil surface as a 5 % dust, r as a 75 % emulsion were both effective in con- rolling wireworm, though the emulsion was rather nore effective than the dust. Immediate mixing f the insecticide with the top layer of the soil was ssential. Chlordane did not affect the quality of he potatoes.—P.J.B.

022 **Mississippi** Agricultural Experiment Station. 63rd Annual Report for fiscal year ending June 30, 1950, State College, 1950, pp. 84.

owpea (*Vigna sinensis*) varieties, pp. 14-15. A cow- ea hybrid (Blackeye × Calico) varies from 22 to 4 % in resistance to weevil attack during storage. . selection of weevil-resistant strains will be made n the basis of palatability.—P.J.B.

023 **Guatemala.** Informe del Instituto Agropecuario Nacional por el periodo de Enero 1948 a Junio 1949. [Progress Report of the National Institute of Agriculture, 1 Jan. to 30 June 1948.] Guatemala, [n.d.], pp. 136, English translation pp. 80-134. [Received 1952]

NVESTIGATIONS REPORTED :

. The results of comparative yield trials with 25 f the best wheat varieties are tabulated, pp. 93-5. pplications of 1.5 lb. of 70 % sodium salt of ,4-D per acre gave excellent control of wild mus- rd [specific name not given] in wheat and oat elds, when the mustard plants were half-grown or ss.

. Forty-six varieties of oats and 27 varieties of arley are under trial, p. 96.

. The performance of 67 imported rice varieties . tabulated, pp. 96-8.

. Seed of 17 strains of kenaf (*Hibiscus canna- inus*) were introduced and sown, p. 99.—C.L.S.

024 MARASSI, A. L'Oriente peruviano e la Stazione sperimentale agraria di Tingo Maria. [**Eastern Peru and the Tingo Maria Agricultural Experiment Station.**] *Riv. Agric. subtrop. e trop.* 1951, **45**, 62-84 and 172-95, bibl. 8, illus., English summary p. 195.

fter giving data of crop areas and crop production Peru, eastern Peru and its climate are described. his forest-covered region is cultivated to a very nall extent. The Tingo Maria Station was founded eastern Peru in 1942. An account is given of its varied activities, from 1942 to 1948, including the introduction and development of cereals, root crops, fibre crops, cover crops and green manures. The following were the main crops showing promise: *Coix lachryma-jobi*, grown for grain; maize, the varieties Cuban Yellow Dent, Cuban Yellow Flint, Venezuela 2 and the local variety Pozuzo gave the best results; rice, dry-land rice can only be grown in the forest where the best yields were obtained from the varieties Catetao Dourado and Secano Brazil; sweet potato, Wennop, Wenholz and Don Juan appeared to be the best varieties; *Manihot esculenta*, S. Martin, Provinciana and Negra Norteña were the best varieties; groundnuts, the varieties Virginia Bunch and Running Jumbo appeared to be suited to the region; soyabean, for oil and green manure, the best varieties were Soya Amarilla, Ogden and Charlec; *Hibiscus cannabinus*, grown for fibre.—E.B.O.

1025 **Fiji** Department of Agriculture. Annual Report for 1951. Suva, [n.d.], pp. 40. [Received 1952]

INVESTIGATIONS REPORTED :

1. Weed control, pp. 13-14. *Mimosa invisa* (Giant Sensitive plant) was sprayed with 1 % Dinoc in diesel oil with excellent results.
2. Rice varietal trials, p. 37.—C.L.S.

1026 **Madras.** Administration reports of subordinate officers of the Department of Agriculture, Madras, 1948-49. Madras, 1951, pp. 455.

INVESTIGATIONS REPORTED :

1. Rice, pp. 17-22. The results of an experiment to compare rice broadcasting and dibbling with transplanting under wet conditions confirmed that the broadcasted crop was 10 days earlier but poorer in yield. The optimum seed rate for broadcasting is 80 lb. [per ac.] for manured and 100 lb. for unmanured fields.
2. Cotton, pp. 26-39. A re-selected irrigated American-type cotton for winter, Co4/B40, was observed to be cosmopolitan, early, resistant to blackarm, long in staple and suitable for distribution.
3. For irrigated American-type cottons on black soils, MA2 once again proved to be a consistent yielder and jassid-resistant [see *Fld Crop Abstr.* 4 : 790], but it possessed defects in boll-opening, spinning performance and blackarm resistance.
4. Work on unirrigated American, Sea Island, Karunganni, 'Cocanidas,' 'Northerns', 'Westerns' and Nadam cottons is reported.
5. Millets, pp. 40-64. The results of testing improved strains of *Sorghum vulgare*, *Pennisetum typhoides*, *Eleusine corocana*, *Setaria italica* and 4 minor millets are given.—C.L.S.

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an sets a target for cotton cultivation on an area of
0,000 ha. *Tidskrift för Lantmän* November, 1951.—R.P.J.

ustralia

34 New Maize Hybrid. Seed of Jubilee a new, late-
aturing maize hybrid will be released by the N.S.W.
epartment of Agriculture for sowing by registered growers
is season (1951-52). The stalks of the new variety are
rong and its ears are of good size, with yellow, high-
ality grain. The husk-cover is superior to that of other
te-maturing types. Jubilee is recommended for sowing
ly in coastal districts north of the Shoalhaven river.—
gric. Gaz. N.S.W. November, 1951.—K.L.

SA

35 Krilium. The Monsanto Chemical Co., St. Louis,
ssouri, has announced that it has successfully developed
series of synthetic resin soil conditioners (including a
drolyzed polyacrylonitrile and other polyelectrolytes)
ich have the property of improving the structure of
ls with a high clay content. The commercial products
ve the trade name, Krilium. According to early informa-
n, Krilium is promising for a variety of uses, e.g., in
getable and flower gardens, greenhouses, in establishing
w lawns from seed, in sport-field maintenance and in
sion control, particularly on highways and rights-of-
y. In agriculture it may become useful for upgrading
rn-out farm land. It is known that under continuous
ltivation the organic matter of the soil becomes ex-
usted so that the soil loses its crumb structure and becomes unsuitable for cultivation. Krilium, which consists of fine, light yellow, hygroscopic crystals, is said to be a synthetic substitute for the natural polysaccharide or polyuronide gums derived from humus. Krilium, it is claimed, improves soil structure by restoring and stabilizing the clay aggregates; thus it should promote increases in crop yields. In its structure-improving capacity, 1 lb. of Krilium seems equivalent to the natural gums produced by 100 to 1000 lb. of manure or plant residues. There is an indication that Krilium, which is not leached out by water, retains its aggregating power against decomposition by soil micro-organisms, in some cases for at least 10 times as long as the natural crude organic matter. The complete chemical formula of Krilium is not disclosed but it is believed to contain a chain-molecule having the empirical formula $(CH_2CH\ (COONa)\ )\ x$. It is claimed that when Krilium is dispersed in the soil and becomes soluble in soil water, it frees its anions, which bind the colloidal clay particles of the soil. The maximum aggregating effect is obtained in the presence of small amounts of Na, Ca, Mg and other cations which normally are present in the soil. When used for agricultural purposes, Krilium exerts its soil building properties in concentrations from 0.02 to 0.10 % of the weight of the soil tested. Concentrations over 0.2 % may be detrimental. To stabilize the soil and to allow a vegetation cover to form in erosion control, Krilium should be broadcast evenly over the soil surface, at the rate of 0.5 to 1 lb. of pure product per 100 sq. ft. Research is being continued to reduce the cost of Krilium which is given as 25s. to 30s. per kg. (about 11s. to 14s. per lb.). From *Herb. Abstr.*—E.B.O.

FIELD CROPS

CEREALS

WHEAT

1036 Perekaljskiĭ, F. M. **[Direction of the drills of a sown area.]** [Russian] *Selek. Semenovod.* 1951, **18**, No. 7, 70-3. [Inst. Grain Husb. Non-Black Earth Zone]

The different direction of the drills in relation to the four cardinal points of the compass had a dissimilar effect on the growth, development and yield of spring wheat. A north to south direction of the drills gave decidedly better results than an east to west direction, the yields being from 1 to 3 centners per ha. larger. With a north to south direction of the drills the plants utilize sunlight and moisture more fully and are less subject to excessive heat. The advantage of sowing from north to south shows itself, with early and late sowings, when distances between the drills are 15 cm. and 10 cm.—R.P.J.

1037 Robinson, D. H. **The spring grazing of autumn-sown corn [wheat].** *Agriculture, Lond.* 1951, **58**, 255-8. [NAAS, W. Midland Province]

From the results of a number of trials in different parts of Britain, it is concluded that the grazing of winter-sown wheat after the end of March reduces subsequent grain yields by up to 3 bu. per ac., while if grazing is continued into mid- or ate-April it can reduce yields by up to 6 cwt. per ac., compared with ungrazed crops. The application of 1 to 1.5 cwt. per ac. of sulphate of ammonia as a top-dressing immediately after grazing halved the reductions in grain yield.—P.J.B.

1038 Kansas Agricultural Experiment Station. Bull. 345. **Winter wheat for pasture in Kansas.** By *A. F. Swanson* and *K. Anderson.* 1951, pp. 32.

A review is given of the utilization of winter wheat for pasture in Kansas, where about 65% of the total acreage of winter wheat is so utilized. A summary is given of past trials to determine the effect of winter grazing on grain yields. Practical recommendations are made. [From *Herb. Abstr.*] —P.J.B.

1039 Oliva, A. Lo stato attuale della granicoltura nell'Italia settentrionale: le razze granarie e loro possibilità. **[The present position of wheat cultivation in northern Italy: the wheat varieties and their possibilities.]** *Genet. agr.* 1951, **3**, 143-53, English summary p. 153. [Ist. Agron. Univ. Firenze, Italy]

The evolution of wheat cultivation in northern Italy from the beginning of this century, when the highest wheat yields were 16 to 18 q./ha., up to the present, is described. The wheat area is now 1,370,000 ha. with a total yearly production of about 33,500,000 q. The present position in the plain, hills and mountains is examined separately and the principal varieties grown are mentioned. The greatest progress has been achieved in the plain where, in several provinces, the average yield is now over 30 q./ha. The recommended rates of manuring for wheat are about 100 to 160 kg. of phosphoric anhydride and 40 to 80 kg. of nitrogen fertilizers per ha. It is thought that, by improving further the soil and the varieties grown, the total wheat production of northern Italy will in a few years reach 40,000,000 q.—E.B.O.

1040 Washington State College. Bull. No. 525. **Brevor and Elmar—two new winter wheats for Washington.** By *O. A. Vogel* and others. 1951, pp. 8.

Brevor is a soft, white wheat, with short to medium-long white straw, and a high resistance to lodging. Elmar is a medium-tall, white club wheat very similar to Elgin and with good resistance to lodging. Both varieties have outyielded Elgin and 6 other commercially-grown winter wheats in trials during 1946-50 in eastern and central Washington: they have good baking quality and are resistant to bunt and smut.—P.J.B.

1041 Texas Agricultural Experiment Station. Bull. 734. **Quanah wheat.** By *I. M. Atkins.* 1951, pp. 10.

Quanah is a hard, red winter wheat, derived from a complex cross (Comanche × Honor-Forward) × (Mediterranean-Hope × Comanche). Its yields have in most cases exceeded those of the present commercially-grown wheat varieties in Texas. It has shown a high degree of resistance to the common races of leaf- and stem-rust in Texas and to bunt. It is less winter-hardy and drought-resistant than certain commercial varieties at present in use and it is not recommended for growing outside the Rolling Plains and Central Texas areas, to which it is adapted. Quanah wheat takes approximately the same time to mature as Comanche and is well suited for combining, but is somewhat less tolerant of close grazing in spring. Its milling quality is similar to that of Comanche.—P.J.B.

1042 Briggs, F. N. **Registration of improved wheat varieties, X1X.** *Agron. J.* 1952, **44**, 155.

A brief description is given of the USA variety Kiowa (Reg. No. 346), a selection made from a Chiefkan × Oro-Tenmarq cross made in 1938. It is a mid-season, medium-tall winter wheat, with high grain yield, good test-weight, stiff-strawed and resistant to shattering and bunt.—P.J.B.

1043 United States Department of Agriculture. Circ. No. 861. **Distribution of the varieties and classes of wheat in the United States in 1949.** By *J. A. Clark* and *B. B. Bayles.* 1951, pp. 71.

Data are given of: (1) the total area occupied by the wheat varieties grown in each State at 5-year intervals since 1919; (2) the estimated acreage and percentage of the total area under wheat occupied by the different classes of wheat in each State and by individual varieties within each class in the USA. Brief notes are given of the main varieties within each class. The total acreage under all classes of wheat was 85 million and a total of 199 varieties are specified in this survey, of which 118 were the product of experimental stations and occupy three-quarters of the total acreage in the USA.—P.J.B.

1044 Aitken, T. R. and others. **Quality of Australian wheat varieties grown in Canada.** *Sci. Agric.* 1951, **31**, 439-53, bibl. 3. [Grain Res. Lab., Board of Grain Commissioners, Winnipeg, Manitoba]

During 1949, the introduced Australian bread-wheat varieties Gabo, Kendee, Bencubbin, Celebration, Charter, Gular, Yalta and Cailloux were compared with the standard Canadian varieties Thatcher and Marquis in field trials at 4 widely-separated locations. None of the Australian varieties outyielded Thatcher and none was less than one day later in maturity. The two highest-yielding Australian varieties were Gabo and Kendee, with an average of 34.3 and 34.2 bu. per ac., compared with 30.6 and 34.6 for Marquis and Thatcher, respectively. Yalta and Cailloux appeared to be the least satisfactory Australian varieties. All the introduced varieties had very stiff straw. Gabo and Gular had an average of 0.9 and 38.8% of leaf rust-infected plants, compared with 57.5 and 77.5% for Marquis and Thatcher, respectively. The introduced varieties were of better baking strength and had a higher protein content than corresponding Canadian varieties. Gabo and Gular were exceptions to this rule in that their average protein content was slightly lower than that of the remaining varieties, but their baking strength was similar and their dough quality was superior. Pusa 4, an Australian variety subjected only to the baking-quality tests, was of exceptionally high protein content (15.8%) and of very high all-round baking quality, being superior to Marquis and Thatcher in these respects. It is considered that Gabo and Gular, which are resistant to leaf rust and of good milling and baking quality, may be of value to Canadian wheat breeders.—P.J.B.

1045 Nicholson, G. **Varieties of wheat recommended for 1952 sowing.** *Agric. Gaz. N.S.W.* 1952, **63**, 8-12, 22 and 56.

A general account is given of the varieties of wheat recommended for sowing in the 1952 season for the various regions of the wheat belt of New South Wales. Brief descriptive notes are given of 12 varieties recommended to be grown for grain. —K.L.

1046 Thorpe, H. C. **Varieties of cereals for the coming season, 1952-53 [in Kenya].** *K.I.O. Fortnightly* 1952, No. 225, 1-4.

Brief descriptive notes are given of 20 old, and some newly-developed, varieties of wheat; 5 barley varieties and 2 oat varieties for sowing in Kenya in the 1952-53 season. Recommendations are made as to choice of varieties best adapted for growing at altitudes of: below 6000 ft., 6000 to 7000 ft., 7000 to 8500 ft. and above 8500 ft. Two new physiologic forms of black stem rust of wheat, K10 and K11, appeared in Kenya last season and trials are in progress to discover which of the popular wheat varieties are susceptible to these rusts. Until these trials are complete, farmers are advised not to grow one wheat variety only, but to lessen the risk of total loss from rust by growing several varieties.—K.L.

1047 Moja, A. Un triennio di indagini su venti razze di frumento. **[Three years' investigations on 20 wheat varieties.]** *Humus, Milan* 1952, **8**, No. 1, 15-21. [Ist. Agron. Univ. Milano, Italy]

These investigations were conducted at the Monza Agric. Expt Farm, Italy, during 1947-9, to determine the most suitable wheat varieties for the northern part of the Milan province. The varieties Florio, S. Pastore, Fiorello, S. Luca and Salto gave the best results. Florio yielded 54 q./ha. in 1948. The first 3 varieties showed particularly good adaptation to the region.—E.B.O.

1048 Biagini, A. Sperimentazione granaria in provincia di Pisa. **[Wheat trials in Pisa province (central Italy).]** *Agricoltura toscana* 1951, 6, 307-15, illus.

An account is given of trials carried out in 1950-51 at S. Rossore, Pisa, on plots of 50 sq. m. each on soil of medium fertility, to test the following wheat varieties new to this zone: Razza C, Orlandi, Mara, Razza B, Rondine, Grifo, Freccia, Marchetti 102, Marchetti 112, Razza P and Funo. They were compared with the following varieties already established in the area: Baudi, S. Pastore, Faleria, Roma, Ancona, Impeto, Mentana and Autonomia. Climatic conditions during the year were bad for wheat and an average yield of about 30 q. of grain per ha. was obtained from all the varieties. Ancona and Marchetti 102 gave the highest average yield of 36 q./ha., Impeto gave nearly 35 and S. Pastore 33 q./ha. Marchetti 112 and Grifo gave the lowest average yield, about 25 q./ha. The yield from the other varieties approached the average of 30 q.—E.B.O.

1049 SWEDEN. Statens Jordbruksförsök. Medd. No. 32. Sortförsök med vårvete. Sammanställning av resultaten av de av Statens Jordbruksförsök ledda sortförsöken med vårvete under åren 1940 (1935)—1948 (1950). [**Variety trials with spring wheat. Summary of results obtained in variety trials with spring wheat conducted by the Swedish National Agronomy Experimental Station during the years 1940 (1935)—1948 (1950).**] By *S. Eliasson* and *G. Jacobson.* 1951, pp. 116, bibl. 78, English summary pp. 106-11. [Stockholm]

Details are given of trials in each of 14 agricultural districts of Sweden. The varieties tested included the following Svalöf varieties: Extra Kolbein II, Diamant I, Fylgia, Diamant II, Rival, Progress, Ella, Fylgia II, 0978, 01086 and Ög 01140, the Weibull varieties Atle, Brons, Pondus, Kärn, 4138 and 4808, the Finnish varieties Tammi and Kimmo and the Norwegian varieties Fram II and Snøgg I. Notes are given on the origin of these varieties, together with data on yields, growth period, hectolitre weight, 1000-grain-weight and crude protein content.—P.J.B.

1050 ÅKERMAN, Å. Undersökningar rörande vinterhärdigheten hos svenska lantveten. [**Investigations into the winterhardiness of indigenous Swedish wheats.**] *Forskn. fors. landbr.* 1951, **2**, 6-17, bibl. 5, English summary p. 17.

Data are given of the results of trials during 1940 and 1947 to determine the winterhardiness of indigenous Swedish winter wheats and a large number of new Swedish and introduced varieties. The only introduced varieties showing the same winterhardiness as the indigenous Swedish varieties were the Norwegian Enger, the Esthonian varieties Kuusiku and Luunja and the Minnesota variety Minhardi.—P.J.B.

1051 STRAND, E. Sortforsøk med høsthvete på Sør-Østlandet i 12-års perioden 1937/38 til 1948-49. [**Varietal trials with winter wheat in south-eastern Norway during the 12-year period 1937/38 to 1948/49.**] *Meld. Norges. Landbr. Høgsk.* 1951, **31**, 1-22, bibl. 17 English summary pp. 18-19.

Trials with varieties and lines of winter wheat were carried out at Vollebekk and at a number of other locations in south-eastern Norway. The variety Th 0102 was used as a standard. The highest yields were given by two new Th 0102 × Sol crosses, namely Follo and 012, the average yields of which were respectively 14 and 12 kg. per decare above that of Th 0102, followed by Enger, with 10 kg. per da. more than Th 0102. Of a number of Swedish varieties included, only Ergo exceeded the standard, with an average of 4 kg. per da. more than Th 0102. Follo, 012, 055-12, C37, Enger and Sigyn all appeared to have satisfactory winterhardiness in east Norway, while the Swedish varieties Svea II, Gluten, Pärl, Ergo and Thule II were rather less winter-hardy and for this reason gave lower yields than locally-produced varieties. Sigyn had a high degree of winterhardiness and resistance to lodging, but gave yields only slightly above those of the standard variety. In comparisons of the yields of spring and winter wheat, the average yield of 3 winter wheat varieties was only 19 kg. per da. higher than that of 3 spring wheat varieties.—P.J.B.

1052 DA SILVA, A. R. Estudos preliminares para a produção de variedades de trigo resistentes às ferrugens no Brasil. [**Preliminary studies for the production of rust-resistant wheat varieties in Brazil.**] *Bol. Serv. nac. Pesq. agron.* 1947, No. 1, pp. 53, bibl. 48, chart 1, English summary pp. 48-9. [Received 1952] [Univ. Minnesota and Minist. Agric., Brazil]

Brazilian wheat varieties have been tested for resistance to different rust races and breeding for stem-rust resistance has been initiated. In an experiment with light intensity and length of day, the major differences in stem-rust reactions were due to the reduction of light. The response of the rust in the moderately susceptible variety Hope was greater than that in the resistant variety Khapli. Length of day had little influence.—From author's summary.

1053 SÁNCHEZ-MONGE, E. and VILLENA, L. M. La clasificación varietal de *Triticum aestivum* L. s. 1. [**The varietal classification of *Triticum aestivum* L. s. l.**] *An. Est. exp. Aula Dei* 1952, **2**, 250-69, bibl. 7, English summary p. 269.

The criteria for the varietal classification of *Triticum aestivum*, as used in R. Mansfeld's recent revision, are described and a key for the varietal classification of this species is given. The varieties *chini* and *blaringhemi* with purple grain, described by C. K. Chun, are included and the variety *huangyangense* is added to the synonymy of the variety *lutinflatum*.—From authors' summary.

1054 Landi, R. Ricerche intorno alle lesioni dei semi di frumento. [**Investigations on the injuries to wheat seeds.**] *Genet. agr.* 1951, **3**, 121-8, bibl. 13, English summary p. 128. [Ist. Agron. Univ. Firenze, Italy]

It is important to determine the percentage of wheat seeds with hidden injuries in seed lots for sowing. A method was studied of staining the embryo of injured seeds with tetrazol solutions at 1 per thousand, for 4 to 6 hr. This method was compared with the germination method and the microscopic method using samples of machine-threshed wheat seed of the variety Est 72, with different moisture contents. It appeared that the staining method can successfully replace the microscopic method for determining the percentage of injured seeds, and that this percentage increases as the moisture content of the seeds decreases. [See also Abs. 702.]—E.B.O.

1055 Cavazza, L. Influenza reciproca di cariossidi di frumento in germinazione. [**Reciprocal influence of germinating wheat seeds.**] *Nuovo G. bot. ital.* 1951, **58**, 397-404, bibl. 10, English summary pp. 403-4.

Trials were carried out with 4 wheat varieties to study the reciprocal influence of germinating seeds. The wheat seeds were arranged by placing the embryos in contact, and at varying distances; by employing the same kind of seed; by mixing seeds of different varieties or different viability. There appeared to be a stimulating factor in young seeds and an inhibitory factor in old ones. These effects decreased as the distance between seeds increased. Suppositions are made regarding the nature of the stimulating factor.—E.B.O.

1056 Cavazza, L. Osservazioni sull'azione stimolante del borace. [**Observations on the stimulating action of borax.**] *Nuovo G. bot. ital.* 1951, **58**, 392-3, English summary p. 393.

Borax was employed in solution, at concentrations ranging from 0.03178 to 3.178 parts per thousand, for treating wheat seeds. At low concentrations it had a stimulating effect on the growth of the primary root, the lateral roots, the coleoptile and the leaves. At higher concentrations the stimulating effect decreased and was eventually replaced by an inhibiting effect. The concentration giving the optimum stimulation was different for the different parts of the plant examined.—E.B.O.

1057 Kozjmina, N. P. and Iljina, V. N. [**Concerning the causes of the low yield of gluten from wheat in some eastern zones of the USSR.**] [Russian] *Doklady Vsesojuz. Akad. S.H. Nauk* 1951, **16**, No. 12, 20-5, bibl. 5.

Samples of wheats from the eastern zones which give low yields of crude gluten contain from 11 to 13.9 % protein. The main cause of the reduction in the yield of gluten is defective drying of the grain.—R.P.J.

1058 Cymbal, M. M. and Jakimenko, T. V. [**Utilization of the feed-steaming plant ZK-0.5 for single-phase thermal disinfection of seeds of wheat and barley.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 5, 66-9.

In élite seed production at the Sineljnikovkaja Selection Experiment Station of the Ukrainian Research Institute of Grain Husbandry the method of single-phase thermal disinfection of seeds has been employed since 1946 to control smut of wheat and barley. In 1951 the method was in use on 29 regional seed farms in the Dnepropetrovsk, Zaporozhye and Voroshilovgrad provinces. The recent model of feed-steaming plant ZK-0.5, employed in the Dnepropetrovsk province for seed disinfection, is convenient to use and gives good results.—R.P.J.

1059 Bonaventura, G. Osservazioni sulle mondiglie di alcuni frumenti coltivati in Romagna. [**Observations on the weed seeds of some wheats grown in Romagna (Italy).**] *Nuovo G. bot. ital.* 1951, **58**, 407-14, bibl. 4, English summary p. 414.

Twenty-three seed samples of wheat, 1 kg. each, from the plain, hills and mountains of Romagna were examined before sifting. Details are given of the locality and the soil where the wheats were grown. A table gives the weed species found (84), their number in each sample and their biological form. There is a prevalence of therophytes. The most frequent weed species in the 3 environments (plain, hills and mountains taken together) were: *Alopecurus agrestis*, *Avena fatua*, *Lolium perenne*, *Allium* sp., *Muscari comosum*, *Ranunculus arvensis*, *Vicia sativa*, *Galium tricorne* and *Valerianella dentata*. Other species found were characteristic of their particular environment. In the mountain wheats there is a greater number of weed species than in the wheats from the hills and the plain.—E.B.O.

1060 Stryckers, J. La lutte contre l'épi du vent (*Apera spica-venti* P.B.) dans le froment, au moyen de la calcyanamide. [**Control of corn grass (*Apera spica-venti*) in wheat by means of calcyanamide.**] *Rev. Agric.* 1951, **4**, 1600-5, bibl. 7. [Inst. Agron. Gand, Belgium]

Apera spica-venti readily germinates and grows vigorously on soils intermediate between sand and clay. It attains a height of 30 to 90 cm. and flowers from June to July. Since it reaches maturity before the wheat harvest there is great danger of its spreading. The weed can be effectively controlled by dusting, in February and early March, with 150 to 200 kg./ha. of calcyanamide. Favourable results are obtained when the chemical is applied on frozen ground during a period which is likely to be followed by milder weather. Mechanical and cultural measures are of little use.—D.B.

1061 PIACCO, R. Il diserbo fitormonico sul frumento. [**Plant hormonal weeding of wheat.**] *G. Agric. Domen.* 1952, **62**, 103, illus. [Sta. sper. Risicolt., Vercelli, Italy]

Results are given of trials conducted to test the herbicides Agroxone 10 (based on Methoxone), Weedone 40 (based on the ester of 2,4-D) and Erbitox 40 (based on the sodium salt of 2,4-D), applied at different rates on the wheat variety Orlandi (0.10), at the end of the tillering stage and in the boot stage, with the object of determining the most suitable rates of application and their effect on the yield and growth of wheat. It appeared that treatment should be given from 15 March to 15 April, the maximum doses being 2 kg./ha. of Weedone 40 or Erbitox 40 and 8 kg./ha. of Agroxone. These rates should be gradually reduced to half the amount as treatment is delayed to later in the season.—E.B.O.

1062 HENRY, A. W. and others. **Control of covered smut of wheat by rapid seed treatment with an antibiotic.** *Science* 1952, **115**, 90-1, bibl. 2. [Plant Sci. Dept, Alberta Univ., Edmonton]

In greenhouse trials, 0.5 and 1 % Actidione dusts with a clay diluent, applied at rates of 0.5 and 1 oz. per bu., and also 10 ppm concentrations of Actidione in an aerosol-water diluent were applied to spring wheat seed to control seed-borne, covered smut (*Tilletia* spp.) infection. In all cases except the 1 % Actidione dust treatment at 0.5 oz. per bu., complete control of covered smut was obtained; 0.6 % only of the wheat heads were smutted in the case of the exception. The percentage of smutted heads in untreated controls was 22.9, while where the clay and aerosol-water diluents were used alone, 6.1 and 8.3 %, respectively, of heads were smutted. The seed was sown on the day after treatment. In all cases, the emergence of seed treated with Actidione was somewhat less than that of the seed treated with the diluents, or the untreated controls. —P.J.B.

1063 STANKOV, A. A. [**Early winter sowing of spring wheat in Rostov province.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 6, 39-44, bibl. in text.

Early winter sowing of spring wheat varieties (chiefly the soft wheat Aljbidum 43) carried out in Rostov province in 1949 confirmed the effectiveness of this method of combating loose smut (*Ustilago tritici*). The seed should be sown at the end of November to the beginning of December and covered to a depth of about 7 cm. The seed rate should be 20 to 25 % higher than the ordinary spring rate.—R.P.J.

1064 AGRICULTURAL GAZETTE OF NEW SOUTH WALES. **The smut diseases of wheat.** *Agric. Gaz. N.S.W.* 1952, **63**, 13-17, illus.

The symptoms and control measures of loose or flying smut, bunt or stinking smut and flag smut of wheat [scientific names not given in text] are described. A list is given indicating the susceptibility or resistance to these diseases of some 18 commercial wheat varieties.—K.L.

1065 LEUKEL, R. W. **Co-operative seed-treatment tests on small grains in 1951.** *Plant Dis. Rep.* 1951, **35**, 445-50, bibl. 3. [Cereal Crops and Dis. Div., U.S. Dept Agric.]

Trials were carried out in 1951 at a number of locations to compare a number of fungicidal seed treatments for the control of bunt in the highly susceptible wheat variety Ulka, stripe of barley and smut of oats. The only fungicides that reduced the bunt infection percentages of the heavily-inoculated wheat to 1, or less, were: Aagrano slurry, (10 g. dust per 150 cc. water; 3 cc. per 500 cc. seed), diluted Panogen (1 part Panogen per 9 parts water; 3 cc. per 500 cc. seed), Ceresan M. slurry (rate as for Aagrano) and Mercuran A.L. (10 cc. per 150 cc. water; 3 cc. per 500 cc. seed). Ceresan M dust, copper carbonate, Spergon, Aagrano dust, Phygon, C and C640 and Anticarie were somewhat less satisfactory, their effectiveness being in the order given. Vancide and Arasan were only moderately satisfactory, while Agrox, Leytosan, Dynacide and L-224 gave poor control. The results varied widely, in some cases, from location to location. All the treatments used reduced the incidence of stripe in barley to below 1%. With oats, Ceresan M, Aagrano dust and slurry and diluted Panogen reduced smut incidence to a trace, while concentrated Panogen (0.3 cc. per 500 cc. seed) gave complete control of smut in all trials.—P.J.B.

1066 MULLIN, J. and others. **Wheat midge.** *Nature, Lond.* 1952, **169**, 629-30, bibl. 2. [Dept Agric., Dublin]

This note describes the damage to wheat crops, in certain districts of Ireland during 1951, caused by the larvae of *Contarina tritici* and *Sitodiplosis mosellana*. There is an indication that in small plots good control of the pests can be obtained by the application of a suitable insecticide (preferably before oviposition by the insects). In spite of the objections to the use of DDT (which destroys the natural enemies of the pest), it is considered advisable in years of heavy infestation to spray the wheat crops with some proprietary DDT preparation. If this is mixed in water in the proportion of 1 : 49 and applied at a rate of 50 gal. per ac. a good kill of the midges results. The problem of spraying large fields is discussed and the need for studying the nature of resistance to midge attack in wheat varieties is stressed.—M.H.

1067 GONÇALVES ARAUJO, J. E. Comunicações complementares respeito do problema do "crestamento" do trigo. [**Further communications on the problem of wilt of wheat.**] *Arch. fitotéc. Uruguay* 1951, **4**, 377-86, bibl. 10, illus. [Eliseu Maciel Agric. Coll., Pelotas, Rio Grande do Sul, Brazil]

The disease investigated is one which is observed in cultures in the south of Brazil and is characterized by poor germination and development ; the plants affected seldom exceed 20 cm. in height, and while a few succeed in earing, no grains are formed. The disease appears in patches in the middle of a normal culture. An account is given of soil studies which lead to the conclusion that a high proportion of exchangeable aluminium is possibly the cause of the disease. Experiments in the use of a corrective are in progress.—G.M.R.

1068 BIANCHI, A. and FORLANI, R. La fioritura nel frumento. [**Flowering in wheat.**] *Genet. agr.* 1951, **3**, 51-88, bibl. 9, English summary p. 88.

The flowering dates of several wheat varieties and their hybrids were studied with the object of determining the behaviour of the earliness factor.—E.B.O.

1069 GRIES, G. A. and others. **Differential responses of wheat varieties to temperature during vegetative and reproductive stages.** *Proc. Ind. Acad. Sci.* 1950, **60**, 102-6, bibl. 2. [Received 1952] [Purdue Agric. Expt Sta., Lafayette, Ind.]

In trials, the early-maturing variety A16 (4117A16-5-1), the medium-early variety C.I. 12557, and the relatively later-maturing variety Vigo were sown in field plots in mid-October, plants being transferred to a greenhouse at different times during the winter and maintained there at a temperature of 65°F. Plants of all varieties transferred from the field to the greenhouse on 11 October took an average of 117 days to shoot and 179 days to mature ; plants transferred on 27 December took an average of 58 days to shoot and 112 days to mature, while those transferred on 14 April took 7 days to shoot and 69 days to mature. Before complete vernalization, each variety took the same time to mature, but as the period of vernalization was increased by leaving the plants in the field for longer periods, the time taken to mature by the earliest variety, A16, fell progressively, compared with the other two varieties, A16 maturing 10 days before Vigo. In a second set of trials, the plants of each variety were transferred from the field to the greenhouse on 12 January and some groups grown to maturity at 65 and 80°F. and others grown to flowering at 65°F., and to maturity at 80°F. or grown to flowering at 80°F. and to maturity at 65°F. Under conditions of both 65 and 80°F., during the entire growing period, plants of A16 flowered and matured earlier than did those of the other two varieties. A16 flowered 1 week earlier at 80°F. than at 65°F., while the same treatment reduced the time taken to flower in Vigo by 2 weeks. The advantage in earliness of A16 over Vigo lay mainly in the shorter time taken from shooting to flowering. All varieties produced larger plants and higher dry weights of mature ears when grown at 65°F. than when grown at 85°F., the increases in growth being greater than where the plants were grown at 65°F. up to the time of flowering and continued at a temperature of 85°F. In yield trials in north and south Indiana, yield differences between the varieties were very small in northern areas, but in southern areas, A16 outyielded the other 2 varieties by a considerable margin, the result, it is considered, of the superior growth response of the early variety to mild temperatures between shooting and flowering. —P.J.B.

1070 GENKELJ, P. A. and MARGOLINA, K. P. [**Concerning the physiological characteristics which increase the resistance of grain crops to early frosts.**] [Russian] *Doklady Akad. Nauk SSSR* 1952, **82**, 785-8, bibl. 4. [Inst. Plant Physiol. im K. A. Timirjazev, Akad. Sci. USSR]

Results of investigations with wheat (Lutescens 62) and barley (Nutans) indicate that the increased viscosity of the protoplasm of plants not yet ready for overwintering and still growing, contributes to their serious injury by low temperatures. High viscosity of protoplasm assists in increasing resistance to heat, but at the same time lowers resistance to early frosts.—R.P.J.

1071 COÏC, Y. and COPPENET, M. Manganèse et croissance du blé [**Manganese and growth of wheat.**] *C. R. Acad. Agric. Fr.* 1951, **37**, No. 4, 157-9, bibl. 2.

A study was made of the amount of dry matter formed and the quantity of Mn absorbed during the course of growth of wheat plants in (a) a Mn-deficient part of a field, and (b) another part of the same field having some, but little, Mn. The effect of dusting with sulphate of magnanese in the deficient zone was also studied. Findings are shown in 2 diagrams and are discussed. There is a critical period (for winter wheat in Finistère from the end of February to the beginning of June) during which the soil factor is particularly important; this period having passed, there is an increased absorption of Mn by the plant. Dusting small quantities of Mn may create supplementary Mn requirements in the plant and in some cases, therefore, staggered applications may be advantageous. —G.M.R.

1072 GALJČENKO, I. N. [**Morphological characteristics of spring wheat in connexion with lodging.**] [Russian] *Doklady Akad. Nauk SSSR* 1952, **83**, No. 5, 749-52, bibl. 2.

Experiments are reported with spring wheat in which lodging and non-lodging varieties were studied. As a result of copious irrigation (artificial or natural), increased nitrogenous nutrition and the employment of high seed rates, a dense stand is formed and a large total bulk of plants develops with an immense leaf area. In such a stand one finds increased humidity, reduced air temperature, poor ventilation and insufficient illumination; these conditions lead to definte morphological changes in the plant which weaken its resistance to lodging. In lodged plants the lowest internode of the stem was bent. Compared with non-lodged plants, the above-ground parts, were more developed in those which had lodged and they had a larger leaf area on the main stem and on the plants as a whole.—R.P.J.

1073 OVČINNIKOV, N. N. [**The effect of place of formation of pollen in the ear on the hybridization of wheat.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 1, 76-7. [Kišinev State Univ.]

Results are reported of an experiment conducted with the spring wheats OD 13, Aljbidum 43, Melanopus 37 and Kandikans 76/10. The highest percentage of seed setting and the largest seeds were obtained when cross-pollination was effected with pollen from the central part of the ear.—R.P.J.

1074 OHLENDORF, A. and RUDORF, W. Hibridación entre *Triticum aestivum* y *Agropyrum intermedium*. [**Hybridization between *Triticum aestivum* and *Agropyrum intermedium*.**] *Genet. iber.* 1950, **2**, 287-94, bibl. 27. [Received 1952] [Max Planck Inst. Züchtungsfors., Voldagsen-Deutsches Bundes Rep.]

The object of the investigations described was to obtain hybrids resistant to *Erysiphe graminis*, *Puccinia* spp., frost and drought.—E.B.O.

1075 WALKER, T. W. and ROBINSON, D. H. **The influence of nitrogen on the yield of spring wheat.** *Agriculture, Lond.* 1952, **58**, 569-72. [NAAS, West Midland Province]

The results are given of trials during 1948-50 at a number of locations in the west Midlands of England, in which applications of 1, 2 and 3 cwt. per ac. of sulphate of ammonia were applied to spring wheat at the time of sowing. The effect of the N treatments varied considerably from location to location, but the mean grain yields of untreated control plots during 1948-50 were 23.7 cwt. per ac., compared with 26.0 cwt. per ac., where 1 cwt. of sulphate of ammonia was applied. Where 3 cwt. of sulphate of ammonia were applied, mean yields were 28.0 cwt. per ac. It is considered that under almost all normal soil conditions, the application of 1 cwt. per ac. of sulphate of ammonia at sowing time can be recommended for spring wheat; under some conditions, treatment with up to 3 cwt. per ac. may be justified. On plots receiving 3 cwt. per ac. of sulphate of ammonia, no lodging was noted, even in wet years.—P.J.B.

1076 PEDERSON, A. Virkning of kalksalpeter ved anvendelse til korn. [**The effect of calcium nitrate applications on cereal crops.**] *Forskn. fors. landbr.* 1951, **2**, 18-37.

Field trials were carried out to determine the effect on wheat, barley and oats of applications of calcium nitrate made at different times and in different amounts. With wheat, applications of 300 and 600 kg. per ha. of calcium nitrate were used. Grain yields rose uniformly following applications made on 1 and 20 April and 10 May, but fell sharply following applications made on 30 May. The number of stalks per m.^{2} fell uniformly as the date of manurial treatments was delayed. The number of grains per ear followed the same trend as grain yields, while the 1000-grain-weight rose consistently, the biggest increase being for the last date of manurial treatment. The differences in the number of stalks per m.^{2} and the 1000-grain-weight between the 300 and 600 kg. per ha. treatments were small, while the 600 kg. per ha. treatment raised grain yields and the number of grains per ear considerably above that following the 300 kg. per ha. treatments, at all dates of application. With barley, 200 and 400 kg. per ha. applications of calcium nitrate were used. Grain yields were approximately the same for treatments made on 20 April and 10 May, but fell sharply following treatments on 30 May and 20 June. The number of stalks per m.^{2} was approximately the same for the first 2 manurial-treatment dates, rose sharply following treatments on 30 May and fell again following applications on 20 June, to about the same level as that of the 10 May treatments. The number of grains per ear and the 1000-grain-weights followed much the same course and varied little between the two levels of N treatment. Both were much the same following the 20 April and 10 May treatments, fell sharply following the 30 May treatments and rose again following the 20 June treatments. The grain yields and number of stalks per m^2 were higher for the 400 than the 200 kg. per ha. manurial applications at all dates. With oats the same N treatments and dates of application were used as for the barley. Grain yields rose slightly between the 1st and 2nd dates of N treatment and thereafter fell consistently, though not sharply. The number of stalks per m.^{2} remained relatively constant following all dates of application. The number of grains per panicle was closely correlated with grain yields and followed the same course as grain yield in its reaction to the N treatments. The 1000-grain-weight remained relatively constant for the first 3 dates of treatment and rose sharply at the last date of treatment. The effect of early N treatment and increasing the amount of N applied to wheat was chiefly to increase the number of grains per ear, in barley to increase the number of tillers and in oats to increase the number of grains per panicle. Determinations were also made of the effect of N on the N- and protein-content of wheat, oats and barley. Late applications of N resulted in a large increase in the percentage of N in the grain and straw, while early applications resulted in only small increases, compared with untreated plants. The results of these trials are of somewhat limited validity owing to the variations in results caused by climatic conditions from year to year. The trials with wheat were carried out during 4 years, and those with oats and barley during 1950 only.—P.J.B.

1077 LAL, K. N. and YADAV, B. S. **Studies in crop physiology. Effect of farmyard manure and castor cake upon development, yield and seed quality of wheat.** *Proc. Indian Acad. Sci.* Sect. B. 1951, **33**, 69-91, bibl. 34, illus. [Coll. Agric., Benares Hindu University]

The effects of farmyard manure and castor cake each applied at 0, 30 and 60 lb. N per acre were studied in two varieties of wheat, Pusa 4 and Pusa 52, at Benares Hindu University during 1943-4. Growth characters and yield were recorded. Of the two forms of manure, castor cake was better than dung in inducing vegetative vigour, increasing yield and improving the height/tiller ratio and relative growth of the plants. The effects of the different doses of each manure on the growth responses of the two varieties at successive stages in the plants' life-cycle are analysed: the effect of age alone on the number of tillers, and the height of the main shoot, is shown to be important. Manuring Pusa 52 with castor cake at 30 lb. N level gave the maximum economic return.—C.L.S.

1078 SIMAKIN, A. I. [**Alteration in the structure of the plant of spring wheat.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 1, 53-4. [Kuban Agric. Inst.]

Experiments with the hard spring wheat variety Hordeiforme 27 to compare the effect of autumn manuring (fertilizers in powder form) with organic mineral granulated fertilizers applied at the time o sowing indicate that the latter method gives a higher yield by increasing the number of the spikelets and the number and weight of the grains. It is particularly suitable when the cultivation o spring wheat follows a perennial herbage course, under Kuban conditions.—R.P.J.

1079 ELLERTON, S. **Wheat breeding in England : a review of present day possibilities.** *J. Ins corn agric. Mer., Ltd.* 1952, **3,** 100-4, bibl. 5.

The author discusses the origin of present-day wheat varieties and the difficulties of improving yielding ability. Among the important factors in the improvement of wheat varieties are disease- and lodging-resistance, grain-quality, winter-hardiness and resistance to harvest losses by shedding and sprouting. The author thinks that breeding for these factors is less expensive and has the same ultimate aim (to increase yield) as breeding pure lines with higher yielding ability.—K.L.

1080 LØVØ, P. J. Varhvetedyrking i Trøndelag. [**Spring wheat cultivation in Trøndelag.**] *Forskn. fors. landbr.* 1951, **2**, 63-82, bibl. 9, English summary pp. 81-2. [Voll Expt Sta., Trøndelag, Norway]

Determinations were made of the heat-sum (mean temperature during the growing period × hours of daylight during the same period) requirements of Børsum, Ås and Snøgg II spring wheats grown at the Voll Experimental Station, Trøndelag. The influence of factors such as soil type, rainfall and manurial treatment on the value of the heat-sum are noted. During the period from sowing to heading, the heat-sum requirements of the varieties increased as mean temperatures and rainfall rose. The heat-sum requirement during the period from heading to ripening of the grain decreased as mean temperatures increased, though the correlation was not statistically significant. The period required from sowing to grain maturity decreased as mean temperatures increased and rose as mean rainfall increased. Mean temperatures had no significant effect on the heat-sum requirement over this period; increased mean rainfall tended to raise the heat-sum requirement, though the correlation was not particularly marked. The mean temperature during June to August and the mean rainfall during May to July appeared to provide the most reliable indexes for calculating the length of the above-mentioned growth periods under Trøndelag conditions. An increase of 1°C. in mean temperature during June to August reduced the period from sowing to grain maturity by an average of 8.7 days for each of the 3 varieties, while an increase of 100 mm. in rainfall during May to July increased the period from sowing to grain maturity by an average of 10 days. The correlation in both cases was marked. The implication of these results for assessing the dependability of spring wheat maturation in different parts of Trøndelag is discussed.—P.J.B.

1081 WASHINGTON, Food and Agriculture Organization of the United Nations. **World catalogue of genetic stocks. Wheat.** Suppl. No. 1. Pp. 34, 1951.
This publication is a revised version of the catalogue published in January, 1950, and embodies additional material. A tabulated list of the characteristics of each genetic stock entered is given, together with a list of participating countries and the genetic stocks held by each.—P.J.B.

BUCKWHEAT

1082 MCGREGOR, W. G. and MCKILLICAN, M. E. **Rutin content of varieties of buckwheat.** *Sci. Agric.* 1952, **32**, 48-51, bibl. 4. [Canad. Dept Agric., Ottawa]
Determinations were made of the rutin content of 24 varieties of buckwheat, from both the *Fagopyrum esculentum* and *F. tartaricum* species. The rutin content of the *F. tartaricum* varieties

CORRECTION

Field Crop Abstracts. Vol. 5, No. 4, *Abstr.* 1080. Lines 2 and 3. For " hours of daylight " read : " number of days ".

[illegible], bibl. 59.
Descriptions and agronomic data are given of the ollowing spring oat varieties registered in 1950 by he U.S. Department of Agriculture and the American Society of Agronomy; early yellow, Andrew; early white, Cherokee and Nemaha; mid-season yellow, Cody; mid-season white, Overland, Shelby and Zephyr. The following winter oat varieties were also registered: early rey, Mustang and Wintok; early yellow, Arlington and Atlantic; mid-season yellow, Letoria. The egistration numbers of these varieties in the order iven here, are 113 to 124, respectively.—P.J.B.

084 DENMARK. Statens Forsøgsvirksomhet i Plantekultur. Medd. No. 461. Foreløbig meddelelse om forsøg med harvesorter 1949-1950. [**Preliminary report of varietal trials with oats 1949-1950.**] *Tidsskr. Planteavl* 1951, **55**, 177-80.
rials were carried out in Denmark with 10 vareties of oats at 13 locations. On clay soils, Pajbjerg Rex A gave the highest grain yield, with 47.2 hkg. per ha. On sandy soils, Pajbjerg Rex A, Borris Opus II, Pajbjerg Regin and Svaløfs Ørn gave the highest yields, all of which ranged from 32.8 to 33 hkg. per ha. On lowland and upland moor soils, Abed Palu (No. 206) gave the highest yield, with 41.4 and 36.1 hkg. per ha., being 1.9 and 2.2 hkg. per ha., respectively, more than any other variety. A brief description is given of each variety tested.—P.J.B.

1085 LAVRIKOVA, S. [**Measures for increasing the yield of naked oats.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 2, 65-8, bibl. in text. [All-Union Inst. Plant Industry]
On plots of glumed oats and naked oats sown with seeds having similar laboratory germination, the number of seedlings of naked oats was considerably smaller than that of glumed oats. Percentage germination of the glumed oat Golden Rain in the laboratory and in the field, respectively, was 99 and 92.0; of a Canadian variety of naked oat 97 and 63.3; of the VIR 1796 variety of naked oat 98 and 62.6. When seed of naked oats was sown on 30 April, field germination was 7 to 12.4 % higher than when it was sown on 10 May. In addition to increasing the yield, early sowing improved the of the grain. Treatment of the seed of ats with formalin reduced germination, eatment with Granozan increased it.—

ALJKO, V. S. [**Storage of seeds of naked ts.**] [Russian] *Selek. Semenovod.* 1952, No. 5, 72-3. [State Comm. Trials Grain, Crops and Herb. Plants]
t seeds should be stored in layers not exceeding 0.5 m. in depth and ventilated at least 5 times oftener than seeds of glumed oats. It is advisable to store naked oats in separate compartments where they can be isolated from the outer air in damp weather and be ventilated as soon as the weather is suitable.—R.P.J.

1087 IBRAHIM, I. A. **Effect of 2,4-D on stem-rust development in oats.** *Phytopathology* 1951, **41**, 951-3. [Minnesota Univ. Agric. Expt Sta., St. Paul]
The application of sprays of 1000 ppm solutions of 2,4-D to oats inoculated with *Puccinia graminis avenae* Race 8, at periods from 4 days before to 7 days after inoculation, considerably reduced the incidence of stem rust on the plants, the percentage of infection, when the 2,4-D sprays were applied 2 days after inoculation, being reduced to 5 % of that of untreated inoculated controls. It is considered that 2,4-D used as a herbicide in fields of small grains, may be of value as a protector against rust infection.—P.J.B.

1088 Coïc, Y. and Coppenet, M. Expérience sur la carence en manganèse de l'avoine : existence d'une période critique. [**Experiment on manganese deficiency in oats : existence of a critical period.**] *C. R. Acad. Agric. Fr.* 1951, **37**, No. 2, 106-7, bibl. 1.

Oats (Ligowo White) were grown in manganese-deficient soil in pots (35 plants per pot), of which half the number received, in addition to the P and N applied to all, " 0.25 g. $SO_4Mn\ 1\ H_2O$ " per pot. Whereas development and earing in the Mn pots were normal, in the untreated pots foliar symptoms of Mn deficiency were serious and very few ears formed, but later (15 June) a new generation of tillers developed in which the symptoms were less grave and ears bearing grains were formed. The uptake of manganese determined in straw and grain was greater in the Mn (0.61 mg.) than in the untreated pots (0.43 mg.), but in the untreated it was principally in the later-formed tillers that Mn uptake took place (0.37 mg. out of the total 0.43 mg.). It is deduced that a critical period exists during which the plant has heavy Mn requirements which deficient soil is unable to supply. This period passed, it becomes easier for the plant to absorb such Mn as may be present and it can then utilize the absorbed substances, N in particular, to produce new tillers, other conditions, moisture especially, being favourable.—G.M.R.

BARLEY

1089 Alaska Agricultural Experiment Station. Circ. 16. **Edda barley for Alaska.** By *S. C. Litzenberger* and *B. M. Bensin*. 1951, pp. 10. [Palmer]

Edda, a 6-rowed, hulled, rough-awned barley variety, introduced from Sweden, was released to farmers in Alaska in 1951. Comparative trials have been carried out with Edda, Olli and Trapmar since 1946, at a number of locations. Edda has consistently outyielded Olli and Trapmar at all locations, giving 13 to 25 % higher grain yields and has been about 2 days earlier in maturity than Olli, a new variety released in 1950. Edda was also slightly superior to Olli in straw-strength and at least equal to other currently-grown varieties in feeding value and malting quality. It is expected that Edda will occupy an important place in the future of Alaskan agriculture.—P.J.B.

1090 European Brewery Convention. **Report of the Barley Committee, Trials 1/50.** Pp. 61, 1951.

A detailed account is given of each of a number of malting barley varietal trials laid out in 1950 in Belgium, Denmark, England, France, Holland, Eire, Norway and Sweden. The varieties Herta and Rika gave the highest yields and had the stiffest straw but from an industrial point of view were not outstanding. The variety Earl, although tested in only 3 countries seemed the best for malting, but its low yield and weak straw will prevent its cultivation on the Continent. It is thought that Carlsberg best combined the agricultural and industrial qualities required. Its yield was high (although it had a tendency to lodge in slightly unfavourable conditions), it gave a good malt and its grains were much bigger than Kenia.—C.L.S.

1091 Alvarez Peña, M. La clasificación varieta de las cebadas cultivadas. [**The varieta classification of cultivated barley.**] *An. Est exp. Aula Dei* 1952, **2**, 234-49, bibl. 4 English summary p. 249.

A revision is made of R. Mansfeld's key for the varietal classification of cultivated barley, *Hordeum vulgare*. The nomenclature of many varieties is corrected and the varieties *densifurcatum*, *nudimortoni*, *rigens*, *bolimi*, *canescens*, *parvihamatum*, *macrolysis*, *mixtum*, *nigrilaxum* and *viviscens* are added.—From author's summary.

1092 Russell, R. C. and Popp, W. **The embryo tests as a method of forecasting loose-smut infection in barley.** *Sci. Agri.* 1951, **31** 559-65, bibl. 4. [Dom. Plant Pathol. Labs Saskatoon, Saskatchewan and Winnipeg Manitoba]

In trials to determine the efficiency of microscopic tests to determine the percentage of loose-smut (*Ustilago nuda*) infection in barley, the results indicated that the method can give a close estimate of the degree of infection in seed lots and is of value to plant breeders, seed certification officers and seed growers. [See also *Fld Crop Abstr.* 3 : 1277.] —P.J.B.

1093 Cornell University Agricultural Experiment Station. Mem. 305. **Powdery mildew of barley. Studies of yield losses and the inheritance of disease resistance.** By *N. F. Jensen*. 1951, pp. 39, bibl. 23.

Studies were made over two seasons of the effect of powdery mildew (*Erysiphe graminis* var. *hordei*) on barley yields in New York State. Four susceptible, 1 intermediate and 2 resistant varieties were used, their yields being compared with those of control plants dusted with sulphur to control the fungus. In the first year, the yields of 3 of the 4 susceptible varieties were 19, 15 and 10 %, respectively, below that of the controls. In the second year, the yields of the 4 susceptible varieties were reduced 42, 38, 33 and 29 %, respectively, below those of the controls, the greatest absolute yield reduction being 23 bu. per ac. The yield of the intermediate-resistant variety was slightly, but not significantly lower than that of the controls, while the yields of the 2 resistant varieties were slightly higher than those of the controls. The results show that powdery mildew can cause a considerable reduction in barley yields in susceptible varieties.—P.J.B.

1094 Coïc, Y. and Coppenet, M. La carence en manganèse de l'orge. [**Manganese deficiency in barley.**] *C. R. Acad. Agric. Fr.* 1951, **37**, No. 2, 103-5, bibl. 1.

Symptoms of Mn deficiency in 6-row winter barley resemble those observed in wheat and susceptible oat varieties. The symptoms in distichous spring barley, which are different, are described. A study was made of manganese content in the plants of an oats/barley mixture growing in a Mn-deficient field having a non-deficient strip. Some of the plants in the deficient soil were dusted on 23 April, with MnSO$_4$ at the rate of "50kg. MnS0$_4$ 1 H$_2$O per ha.", which produced a clearly perceptible greening from 30 April onwards. For all cereals susceptible to Mn deficiency the critical period is when the plant has 4 or 5 leaves. During this period the barley was richer n Mn than were the oats in the Mn-deficient soil: in he non-deficient strip the Mn contents were approxmately equal. Barley requires probably less Mn than oats for the elaboration of its organic substances. In both oats and barley, Mn deficiency produces a diminution in the Mn content and in the percentage dry matter and an increase in the perentage of ash. Barley yield is greatly reduced by Mn deficiency, although somewhat less than is the yield of oats.—G.M.R.

095 Large, E. C. and Weston, W. A.R. D. **Ear distortion in barley and other cereals caused by spraying with MCPA and 2,4-D.** *J. agric. Sci.* 1951, **41**, No. 4, 338-49, bibl. 10, illus. [N.A.A.S., Cambridge]

Trials made near Cambridge in 1949 and 1950, nder mild and hard spring weather conditions espectively, have confirmed that the findings of berg and Denward in Sweden, and of Pedersen, ndersen and Hermansen in Denmark, [See *Fld rop Abstr.* 1 : 989 and 4 : 218] concerning distorons in barley caused by MCPA and 2,4-D, are also alid under English conditions. Damage to barley aused by the application of MCPA and 2,4-D up to e 2-leaf and early 3-leaf stages may be recognized y the occurrence of many tubular leaves and owed or trapped ears. As little as 2 lb./acre of e amine salt of 2,4-D, applied at this stage may so cause severe stunting of the plants with disrtion of the roots. Damage to barley by the plication of MCPA and 2,4-D at the 3- to 4-leaf ages may be recognized by the occurrence of weaked ears. The application of as little as lb./acre of the sodium salt of MCPA at these ages may cause tweaking in over 50 % of the ears. mine 2,4-D at the same dosage causes more istortion. Although the reduction in yield due to ch tweakings may be slight, the grain sample is irregular in size, with a number of naked grains, and malting quality may be reduced. No appreciable ear distortion was caused, in barley, by the application of MCPA at up to 6 lb./acre, or of amine 2,4-D, at up to 2 lb./acre, when the plants had reached the 4-leaf stage, with tillers in the 3-leaf stage. Later applications, over a period of about a month after this stage was reached, had no visible effect on the ears. Very late applications, in the boot stage, were not tried. No inheritance of the disorders was found in seed from affected crops. Applications of amine 2,4-D, at 2 lb./acre caused leaf and ear distortions in spring wheat, comparable with those in barley, when applied at the 1- to 4-leaf stages. In spring oats, amine 2,4-D, at the same rate of application, and when applied in the 2- to 3-leaf stages, caused severe check to growth, with root distortions and clustered, irregularly branched and partially blasted panicles. Abnormal growth was caused when the 2,4-D was applied at all stages up to the middle of stem extension. Later applications were not made. A number of types of ear distortion in barley, wheat and oats are illustrated and described.—From authors' summary.

1096 van der Paauw, F. De behoefte van gerst aan fosfaat. [**The phosphate requirement of barley.**] 15*de NaCoBrouw Jrb.* 1951, 40-6, bibl. 2. [Agric. Res. Sta., and Soil Sci. Inst., T.N.O., Groningen]

Current manurial recommendations for barley have included ample dressings of P and K. From the results of trials in the Netherlands it is apparent that barley has a low requirement for K. On soils with good K reserves, applications of K have resulted in yield reductions; K is regarded as necessary only on soils deficient in this element. Barley has been shown to have a considerable requirement for P, particularly on sandy soils and with winter barley varieties.—P.J.B.

MAIZE

1097 Vernet, E. La culture du maïs dans l'Aude. [**Maize cultivation in Aude (France).**] *Potasse* 1952, **26**, 2-6.

The area under grain maize in Aude, 11,000 ha. in 1913, was 7000 ha. in 1951 of which 1200 ha. was under hybrid maize. Maize is grown in this region at the beginning of the rotation and is followed by wheat, then oats, and exceptionally by barley or safflower. Lucerne is occasionally included. Advice is given on soil cultivation, manuring, choice of varieties and harvesting. Millette du Lauragais, the local variety, has degenerated, its yield ranges from 15 to 40 q. of grain per ha. An effort has been made to introduce USA hybrids, particularly the early or medium-early types, which yield about 20 % more than the local variety. The hybrids recommended are: Wisconsin 355, Wisconsin 416, Wisconsin 464, Minhybride 706. The approximate date for sowing maize is 25 April. Plant density should be at the rate of 7 plants per 2 sq. m. The practice of topping maize plants for fodder, which lowers the grain yield, is condemned. —E.B.O.

1098 GINAĬLO, F. [**The economic effectiveness of square-pocket sowing.**] [Russian] *Soc. seljs. hoz.* 1952, **23**, No. 3, 22-31.

Results of an investigation to ascertain the economic effectiveness of sowing maize (*Zea mays*) with a special square-pocket seeding machine, Sš-6, indicated that if the yield of maize from drill sowing be placed at 100, its yield with square-pocket sowing in 1949 on experimental plots was 115.7 % and on industrial plots 129 %; the corresponding figures in 1950 were 128 and 130 % and in 1951, 125.8 and 147.5 %. The yield of sunflower in 1949 sown by the square-pocket method was 16, and when sown in drills 14.3 ctr., per ha.; in 1950 the corresponding figures were 15.5 and 13.2 ctr. per ha. The square-pocket method of sowing hoed crops with the Sš-6 seeding machine ensures an increase in yield and a saving in labour.—R.P.J.

1099 ILLINOIS UNIVERSITY Agricultural Experiment Station. Bull. 552. **1951 Illinois tests of corn [maize] hybrids in wide use.** By *J. W. Pendleton* and others. 1952, 407-47. [Urbana]

Detailed results are given of trials with 328 hybrid maize varieties in 7 regions of Illinois.—P.J.B.

1100 OKLAHOMA Agricultural Experimental Station. Misc. Publ. MP-24. **Performance tests of corn [maize] varieties and hybrids 1951.** By *H. Pass* and *J. S. Brooks*. 1951, pp. 28.

Data are presented of performance tests, carried out at 9 locations in Oklahoma, with a large number of maize varieties and hybrids, including 40 experimental hybrids entered by the Oklahoma Agricultural Experimental Station.—P.J.B.

1101 MANONI, R. Mais ibridi d'importazione americana. Risultati conseguiti nella campagna 1950 in prov. di Lucca. [**Hybrid maize from the USA. Results from the 1950 campaign in Lucca province (central Italy).**] *Agricoltura toscana* 1951, **6**, 88-90.

The USA hybrids were more productive than the local maize varieties when grown under irrigation, or without irrigation on cool, fertile soils. Their yield per ha. varied considerably from one area to another. U-41 yielded up to 89 q./ha., about double that of the local variety; Pioneer 340 up to 85 q. and Wisconsin 464 up to 50 q. ha. On dry, mainly clay, soils the hybrids did not ripen completely and generally yielded less than the local varieties which proved to be more drought-resistant.—E.B.O.

1102 TRENTIN, A. Varietà indigene di mais ed ibridi americani ed italiani. [**Local (Italian) maize varieties and American and Italian hybrids.**] *Ital. agric.* 1952, **89**, 174-9. [Ist. Tec. agr. " N. Strampelli", Lonigo, Vicenza, Italy]

A trial was carried out in 1951 to compare the yield, and the possibility of adaptation to the Vicenza, Verona and Padova provinces, of 47 maize hybrids, with 2 more widely grown maize varieties, Marano Vicentino and Nostrano dell'Isola. Part of the hybrid seed was produced in the USA and part in Italy. The crops were not irrigated. The following were the main conclusions: (a) the hybrids yielded significantly more than the local varieties; (b) the hybrids Funk G.19, Ohio M.15, Wisconsin 464 and Kingskrost K.O., which have a vegetative cycle similar to, or slightly longer than, Marano Vicentino (113 days), can advantageously replace this variety which is appreciated for its earliness; (c) the hybrid seed produced in Italy gave higher yielding plants than those from seed of the same hybrid type from the USA, the explanation being that the American seed was 3 to 4 years old and the Italian seed only 1 year old; (d) attacks by pests and diseases were very limited in the year of the trial. [See also Abs. 401.]—E.B.O.

1103 BERGAMO, Stazione Sperimentale di Maiscoltura. Publ. No. 64. Rapporto sulla sperimentazione maidicola 1950. [**Report on experiments with maize in 1950.**] By *L. Fenaroli*. 1951, pp. 49, bibl. 12, illus.

The climatic conditions in 1950, the fourth year in which hybrid maize was grown in Italy, were particularly adverse to maize crops. While there were no attacks by *Helminthosporium turcicum* or *Aplanobacter stewarti* and dwarfing was very limited, there were heavy infestations by Pyralidae and *Sesamia*. The station supervised 25 experimental fields on which trials were conducted to study adaptation and productivity. A schematic account of these trials is given, as well as a 5-page list of the hybrids and varieties tested. The amounts of hybrid maize seed distributed in the whole of Italy in 1950 was 13,683 q. which were sown on 35,226 ha. (2.84 % of the total maize area) at an average rate of 39 kg./ha. Results obtained from this seed are tabulated. Hybrid maize seed was employed in 1950 to a lesser extent than in 1949. Although it was still unsuccessful in many regions, it is thought that if all the maize area in Italy were grown with suitable hybrids, an increase of 10 to 15 million q. could be obtained, bringing the total production to about 40 million q. or sufficient to meet the Italian demand for this crop. The production of hybrid maize seed in

Italy was 10,000 q. in 1950. A list is given of the maize hybrids and varieties tested in northern Italy during 4 years (1947-50) showing their average yield. Conversion tables are given of metric and non-metric measures in common use in maize investigations. [See also Abs. 397.]—E.B.O.

1104 COSTA-RODRIGUES, L. **Comparative studies of commercial and open-pedigree maize hybrids for maturity and yield.** *Agronomia Lusitana* 1951, **13**, 253-7. [Est. Agron. Nac., Sacavem, Portugal]

The results of trials carried out in 1950 under both dry and irrigated farming confirmed those of previous years in showing Wis. 641AA and Wis. 595 to be the best adapted to conditions in Portugal.—G.M.R.

1105 CAPUTA, J. Considérations sur la culture du maïs grains en Suisse romande. [**Cultivation of maize for seed in French Switzerland.**] *Rev. romande* 1952, **8**, 9-13. [Sta. féd. d'essais et de contrôle de Semences, Mont-Calme, Lausanne]

Seed production of late varieties of hybrid maize (maturing in 100 to 110 days) has already been organized in Canton Tessin, and of early varieties (maturing in 80 to 85 days) in Canton St. Gall. Experiments are in progress to study the possibility of producing seed of medium-late varieties (85 to 90 days) in French Switzerland.—D.B.

1106 GORLENKO, M. V. [**Diseases of maize (*Zea mays*) in Moscow province.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 5, 79-80. [Moscow Sta., All-Union Inst. Plant Protect.]

Observations made by the Institute in 1950/51 indicated that for Moscow province diseases of seedlings are the most disastrous of maize diseases. Seeds introduced into Moscow province from other provinces of the Union were infected with *Penicillium* spp. (chiefly *P. griseo-roseum*), and seeds produced locally were infected primarily with fungi of the genus *Fusarium*. *Fusarium* infection of seeds increases during storage, particularly with high humidity of the grain. Disinfection of maize seeds with a Soviet mercuric preparation (Granozan NIUIF—2) protects the seedlings from fungal attack. Experiments showed that germination of seeds treated with this preparation was three times higher than that of untreated seeds. The best results were obtained when the preparation was employed at the rate of 1.5 g. per kg. seed.—R.P.J.

1107 POTES, A. S. Control de las royas del maíz y trigo con espolvoreaciones. [**Control of maize and wheat rusts by means of dusts.**] *Prim. Asamb. Latinoamer. Fitoparasit., Mexico* 1951, 57-61. [Colombia]

Preliminary experiments at the Chapingo Experiment Farm, Mexico, are reported. Fermate (dimethyl dithiocarbonate of iron) was much more effective in controlling maize rust (*Puccinia sorghi*) than was sulphur, which had little or no effect. Sulphur was effective in controlling stem and leaf rust of wheat, but the effect of Fermate was superior.—G.M.R.

1108 RHIND, D. and others. **Occurrence of *Puccinia polysora* Underw. in West Africa.** *Nature, Lond.* 1952, **169**, 631. [W. Afr. Inter-Territorial Secretariat, Accra, Gold Coast]

A rust disease of maize has long been known in West Africa. Prior to 1949 the collections of the fungus (uredospores and teleutospores) were designated *P. sorghi* Schw. The 1949 collections of maize rust from Sierra Leone and later collections from the Gold Coast and Nigeria have been identified as *P. polysora* Underw.—M.H.

1109 SACCAS, A. M. Principaux champignons parasites du maïs (*Zea mays* L.) en Afrique Equatoriale Française. [**The principal fungal parasites of maize (*Zea mays* L.) in French Equatorial Africa.**] *Agron. trop.* 1952, **7**, 5-42, bibl. 14, illus.

Maize is grown on 1.5 % of the total cultivated area in French Equatorial Africa, that is, on about 16,000 ha., the average yield varying from 400 to 800 kg./ha. The primitive cultural methods of the natives, the use of low-yielding varieties and the damage caused by parasites are responsible for the low yields. A description is given of 26 fungus species attacking maize in the field at different stages of growth, with notes on the nature of the damage caused and on control measures.—E.B.O.

1110 DELGADO, M. N. and LUNA, R. H. Control del gorgojo de la semilla del maíz (*Prostephanus truncatus* Horn.) [**Control of the maize seed weevil.**] *Prim. Asamb. Latinoamer. Fitoparasit., Mexico* 1951, 26-9. [Colombia (N.D.M.), and Mexico (R.H.L.)]

In laboratory experiments various insecticides were effective in controlling this weevil, BHC and DDT plus MgO being the most rapid. None of the insecticides tested affected germination capacity in the seed.—G.M.R.

1111 WALLACE, C. R. **Crop protection by jetting.** *Agric. Gaz. N.S.W.* 1951, **62**, 486.

Jetting, a method of crop protection which appears to have originated in New South Wales, consists in projecting a straight and powerful jet of liquid insecticide into the soil from a pump so that it leaves its dissolved, or suspended, chemicals on the underground parts of the plant and/or on the soil around those parts. Jetting has been used successfully, with DDT as the agent, in the control of black beetle (*Heteronychus sanctae-helenae*) attacking the underground parts of maize and other field crops. Field experiments since 1946 have shown that a 0.01 % emulsion of gamma isomer of BHC is more effective than DDT against black beetle. For potatoes and root crops it is provisionally advised that either DDT or one of the deodorised preparations of BHC should be used.—K.L.

1112 Osorio A., F. Las principales plagas del maíz encontradas en los campos experimentales de la Comisión del Maíz durante 1950. [**The principal pests of maize found in the** [**Mexican**] **Maize Commission's experiment fields in 1950.**] *Prim. Asamb. Latinoamer. Fitoparasit., Mexico* 1951, 30-4.

The following, in order of importance, are the pests described and controls found effective. (1) *Laphygma frugiperda* : 3 to 5 % DDT dust, application beginning when the plants are 10 to 15 cm. high. (2) *Macrodactylus* spp. : BHC, 6 % *y* isomer, at 250 g. per 100 l. of water. Parathion, also used, is not advisable, being poisonous to humans. (3) *Aphis maydis* : sulphate of nicotine (Black-leaf 40), at 1 kg. per 800 l. of water plus common soap or any commercial sticker. (4). *Paratetranychus* sp. : sulphate of nicotine, 1 kg. per 800 l. of water, plus sulphur, 1 kg. per 100 l. (5) *Atta* sp. : 3 to 5 % Chlordane dust. (6) *Diatraea* sp. No control suggested.—G.M.R.

1113 Cevallos G., M.A. Control de gorgojos del maíz almacenado en la hacienda. [**Control of maize weevils in the farm granary.**] *Prim. Asamb. Latinoamer. Fitoparasit., Mexico* 1951, 21-6. [Ecuador]

1114 Burdick, A. B. **Evidence concerning the structure of an ear of corn** (*Zea mays* **L.**) *Amer. Nat.* 1951, **85**, 353-6, bibl. 19. [Iowa State Coll., Ames]

Evidence is presented which supports the fusion hypothesis of the origin of the maize ear.—From author's summary.

1115 Oppenheimer, H. R. **Physiological behaviour of maize under irrigation.** *Palest. J. Bot.* R. Ser. 1951, **8**, No. 1, 32-44, bibl. 16. [Agric. Res. Sta., Rehovot]

Maize is grown under irrigation in Israel as a forage crop and sometimes for its grain. Although irrigation experiments with maize have been undertaken, little is known about the physiological behaviour and the water economy of this crop in the field. Preliminary investigations were made at the above Station in 1937 as a basis for the establishment of suitable irrigation schemes. Pending the publication of Schmueli's recent work on this subject in the Jordan Valley, a summary of the 1937 studies on maize is given and the results discussed in the light of certain fundamental physiological works, cited. A sprinkler irrigation experiment carried out during the period June-Oct., 1937, established that there is a close correlation between stem growth (elongation) and grain yield [see also *Herb. Abstr.* 13 : 1318, and 12 : 1356]. A decrease in the growth rate of the stem is considered to be a criterion by which irrigations can be timed. [From *Herb. Abstr.*]—M.H.

1116 Nebraska University College of Agriculture. Res. Bull. No. 166. **Progressive development and seasonal variations of the corn** [**maize**] **crop.** By *T. A. Kiesselbach.* 1950, pp. 49. [Received 1952] [Lincoln]

A considerable amount of summarized data is given on the normal growth changes occurring in field-grown maize and the relation between annual yields and yearly climatic variations in Nebraska. Data are also presented on the effect of frost, drought and day length on maize growth and on the economic value of tillers and seminal roots.—P.J.B.

1117 Vorster, P. W. **The maize industry.** *Fmg S. Afr.* 1952, **27**, No. 312, 171-6 and 189, bibl. 9. [Coll. Agric., Potchefstroom]

After reviewing the development of the maize industry in South Africa, the author discusses the tendency of maize production and the work done on maize improvement by the Research and Extension Services of the Agricultural Experiment Farms.—K.L.

MILLET AND SORGHUM

1118 Niqueux, M. Les millets. [**The millets.**] *Morocco, Direction de l'Agriculture, du Commerce et des Forêts. Les cahiers de la recherche agronomique.* 3. 1950, 401-79, bibl. 46, illus. [Received 1952]

Of the principal small-grain cereals known as millets, viz. : *Pennisetum typhoideum*, *Setaria italica*, *Panicum miliaceum*, *P. miliare*, *P. frumentaceum*, *P. esculentum*, *Paspalum scrobiculatum*, *Digitaria exilis*, *Eragrostis tef*, *Eleusine coracana*, *Coix lachryma-jobi* and *Phalaris canariensis*, the first 3 species, which are considered the most important, are grown for grain in Morocco. This study is concerned mainly with *S. italica* and *P. miliaceum* which are treated from the following aspects : importance of the genera *Setaria* and *Panicum* in the world and in Morocco ; systematics of these 2 genera ; geographical origin, botanical description, varietal classification, flower biology, cytology, genetics, improvement and cultural methods of *S. italica* and *P. miliaceum* ; the work conducted at the Centre de Recherches Agronomiques to obtain improved varieties.—E.B.O.

1119 PERRIN DE BRICHAMBAUT, G. Espèces introduites et spontanées du genre *Pennisetum.* [**Introduced and wild species of the genus *Pennisetum* (in Morocco).**] *Morocco, Direction de l'Agriculture, du Commerce et des Forêts. Les cahiers de la recherche agronomique.* 3. 1950, 369-400, bibl. 18, illus. [Received 1952]

This study of *Pennisetum* species, suitable for forage production in Morocco, includes *P. americanum* which is wild in Morocco and is grown for grain for human consumption in certain African countries. The information given on this species includes its synonyms, vernacular names, geographical distribution, description, cultural methods and uses.—E.B.O.

1120 NOVIKOV, V. A. and ALEKSEENKO, L. N. [**The critical period in millet (*Panicum miliaceum*) in relation to the intensity of light.**] [Russian] *Doklady Akad. Nauk SSSR* 1952, **83**, No. 2, 307-9, bibl. 9. [Leningrad Agric. Inst.]

In millet (as in barley, wheat, oats and maize) there is a critical period in relation to light, which begins from the moment of formation of the tetrad of the pollen mother cells. Its duration was not determined precisely but is evidently less than 8 days.—R.P.J.

1121 KANSAS Agricultural Experiment Station. Bull. 349. **Grain and forage sorghums for Kansas.** By *A. F. Swanson* and *H. H. Laude.* 1951, pp. 55. [Manhattan]

This publication provides a concise review of the origins, classification and cultivation of all types of sorghum grown in Kansas. The numerous types of sorghum are classified under the following heads: (a) forage, or sugar sorghum (sorgo), grown primarily for sugar or forage production and represented by such varieties as Atlas, Ellis and Early Sumac; (b) grain, or non-sugar, sorghums, such as Westland and Midland, grown mainly for grain production; (c) broomcorn, grown primarily for its panicles which are used for making brooms; (d) grass sorghum, grown mainly for hay and grazing, of which sudan grass is the main type. The terms kafir and milo represent two groups of varieties among the grain types. Combine sorghum is used to denote the recently developed dwarf and double-dwarf types of grain sorghum produced for combine harvesting. Among the grain sorghums, two classes with waxy and non-waxy grain have been distinguished during the past 10 years. A description is given of the important varieties of grain, forage, and broomcorn sorghum. Among the forage sorghums described are: Atlas, Ellis Sorgo, Norkan, Axtell, Early Sumac, Leoti Red, Kansas Orange, Kansas Sourless 704-H, Kansas Collier, Black Amber and Red Amber. The grain sorghum varieties include: Westland, Midland, Early Kalo, Colby, Martin, Wheatland, Early Hegari, Combine White Kafir Okla. 44-14, Redlan, Plainsman, Caprock, Double Dwarf Waxy White Sooner, Norghum, Gurno, Improved Coes, Standard Blackhull, Western Blackhull. Red Kafir, Pink Kafir and Cody. Among the broomcorn varieties are: Black Spanish and Scarborough. Data are given of the grain and forage yields of a number of grain and forage varieties grown at different locations in Kansas over a number of years.—P.J.B.

1122 SEED WORLD. **Darset darso moves combine sorghum eastward.** *Seed World* 1952, **70**, No. 8, 8. [Oklahoma Agric. Expt Sta., Stillwater]

Darset, a new, dwarf, combine-type sorghum was released for seed multiplication in spring, 1952. This variety is similar to Okla. No. 1 darso, but with the addition of a dwarf character. It is 7 to 10 days earlier in maturity than Okla. No. 1 and resistant to *Periconia* stalk rot. Darset, suitable for eastern Oklahoma conditions, is complementary to Dwarf White Kafir 44-14 and Redlan, recently released for central and western Oklahoma conditions.—P.J.B.

RICE

1123 RAMÍREZ, G. L. La industría arrocera en el Brasil y Peru. [**The rice industry of Brazil and Peru.**] *Notas agron.* 1951, **4**, 1-33, bibl. 13. [Palmira Expt Sta., Colombia]

Useful information, based on a study tour, is given on rice-growing, its extent and technique, in Brazil and Perú, and on research and breeding at the rice research stations in the Brazilian States of Rio Grande do Sul and São Paulo and the Peruvian Station of La Molina.—G.M.R.

1124 BERNARDES, B. C. A la Federación Nacional de Arroceros. Colombia. [**Address to the National Federation of Rice Growers. Colombia.**] *Notas agron.* 1951, **4**, 35-48. [Rice Res. Sta., Gravatai, Rio Grande do Sul, Brazil]

An expert from Brazil records his impressions of rice-growing in various parts of Brazil and makes suggestions for its improvement.—G.M.R.

1125 VAILLANT, A. La riziculture en Italie du nord. [**Rice cultivation in northern Italy.**] *Agron. trop.* 1952, **7**, 64-79, bibl. in text, illus.

An account is given of information obtained by a mission sent to study rice cultivation in northern Italy. The subject is treated from the following aspects: origin and development of rice cultivation in Italy; factors determining the high yields obtained (6 to 8 tons of paddy per ha.); irrigation problems; illustrated descriptions of the systems adopted in the various Italian regions for planning the flow of irrigation water; soil cultivation and manuring; crop rotations; cultural methods; vegetative cycle of rice; harvesting; grain drying and hulling; and seed selection. The following is an example of a crop rotation in Piedmont: 1st year, wheat, sown in October/November after the rice harvest; 2nd year clover; 3rd year, rice, transplanted in June after the last cut of clover; 4th year, rice sown in April; 5th year, rice sown in April. The rice harvest date is between 10 September and 15 October. The mill returns from the paddy are 65 to 70 % (whole and broken) or 50 to 65 % of whole rice. The Ente Nazionale Risi deals with all economic matters concerned with production, control and prices.—E.B.O.

1126 HALLSWORTH, E. G. and others. **Studies in pedogenesis in New South Wales. I. The influence of rice cultivation on the grey and brown 'gilgai' soils of the Murrumbidgee irrigation areas.** *J. Soil Sci.* 1952, **3**, No. 1, 89-102, bibl. 11, illus.

Rice cultivation was introduced about 26 years ago into the Murrumbidgee Irrigation Areas of the northern Riverina of New South Wales. Water to a depth of 8 in. is maintained over the entire surface of the soil on which rice is grown and a study was made of the soil changes that have followed this practice. Salt (NaCl) has been leached out, even from the deeper layers of soil, and this offers the best explanation of the beneficial effects from rice irrigation that have been observed in the field. Two rice crops appear to be almost as effective as 5 or 6 in lowering the salt content and are much more effective than several years of irrigation under other crops. These results suggest that rice could be grown as a pioneer crop for the establishment of irrigated pastures.—C.L.S.

1127 ROCHE,— Les sols de marais récemment récupérés au Lac Alaotra (Madagascar). [**The marshy soils reclaimed recently at Lake Alaotra (Madagascar).**] *Agron. trop.* 1952, **7**, 43-63, bibl. 4, illus.

An account is given of the investigations, carried out mainly at Lake Alaotra Agronomic Station, to study the marshy soils recently drained in the region of this lake. The management of these soils for rice cultivation is described, including: clearing the land, rice cultivation and manuring, and the use of green manures, cover crops and temporary leys of grasses and legumes for maintaining soil fertility. It is seldom possible in these regions to clear the land for rice cultivation by ploughing under the natural vegetation without burning it first. The method generally followed is to burn the aerial part of the vegetation, and, by maintaining the water level near the surface, to ensure that fire does not affect the peaty soil. Rice is thus sown in a bed of ashes. By this method, the first years of rice cultivation are difficult because the peat is saturated with water, but the fertility of the soil is maintained. In the 1949-50 harvest, there was a high percentage of "blind" grains in the rice-crops, mainly on the land recently reclaimed. This phenomenon was thought to be caused by high temperatures in March, lack of balance between N and P in the soil, etc. In 1950-51 the same phenomenon re-appeared on marshy soils at Vohilava and was found to be caused by a parasitic fungus, *Piricularia oryzae.* Seed disinfection and the use of resistant rice varieties will control this fungus.—E.B.O.

1128 PORTÈRES, R. Les rizières de ruissellement en Casamance. [**The streaming rice-fields of Casamance (Senegal).**] *Rev. Bot. appl.* 1952, **32**, 34-7, bibl. 1, illus.

This method of rice cultivation is practised in Casamance in areas having a yearly rainfall of 1200 to 1500 mm., distributed over 5 to 6 months. The rice-fields are situated on slopes of 2 to 8°, and even up to 15°. Strips of natural vegetation, 4 to 5 m. wide, which follow the contour line, separate the rice-plots which are contour ridged so as to retain the rain-water. Rice is sown or transplanted between the ridges. At the sides of the rice-fields there are bands of natural vegetation which receive any excess of water from the fields. This system of rice cultivation ensures water economy and erosion control. After 2 or 3 years of rice cropping, the fields are rested for 1 or 2 years or more, before repeating the same method. This method of rice cultivation is gradually modified as one proceeds northwards, towards regions of lower rainfall, and southwards, towards regions of higher rainfall.—E.B.O.

1129 ARKANSAS Agricultural Experiment Station. Mimeo. Ser. No. 7. **Rice varietal tests, 1950-51.** By *C. R. Adair* and *E. M. Cralley.* 1951, pp. 3.

Data are given of the average grain yields of 11 rice varieties grown at 4 locations in Arkansas. Eight varieties were tested during 1946-51. The varieties grown included 1 short-grained, 4 medium-long-grained and 6 long-grained varieties. Among the medium-long-grained varieties, Arkrose gave the highest yields at 3 out of 4 locations, followed by Kamrose, Zenith and Magnolia. Among the long-grained varieties, Nira 43 gave the highest grain yields at 2 out of 4 locations, while Rexark gave the highest yields at the other two locations, followed by Bluebonnet. Three new long-grained varieties were tested during 1950 and 1951, viz: Improved Bluebonnet, Century 52 and Century 231, all of which gave satisfactory yields.—P.J.B.

1130 CADA, E. and others. **A comparative test of five upland rice varieties under Pangasinan conditions.** *Philipp. J. Agric.* 1951, **15**, 49-58, bibl. 3.

The trials were carried out in the Philippines over a 3-year period, the varieties tested being: Carreon, Dinalaga, Carti 42, Fortuna and Pinablo. Pinablo consistently gave the lowest yields and appeared to be least well adapted to strictly upland conditions. The remaining 4 varieties all gave very much the same yields. Fortuna and Carreon appeared to be resistant to drought, while Carti 42, Dinalaga and Pinablo were visibly affected by prolonged absence of rainfall. Fortuna was most resistant to lodging, while Carreon and Carti 42 lodged readily before maturity. Pinablo was the latest in maturing, though all came to maturity in about 125 to 130 days.—P.J.B.

1131 RICHARDSON, H. L. **Co-operative Rice Hybridization Project.** *Internat. Rice Comm. News Letter* 1952, No. 1, pp. 2.

Among the cultivated rices of Asia two races are recognized, *Oryza sativa* var. *japonica* and *O. sativa* var. *indica*. The former is characterized by: short stiff straw, the need for a long day with cool temperatures, bold type of grain with a high percentage of rice to paddy and high yields in response to heavy manuring. The *indica* race grows in a hotter climate, cannot stand heavy manuring and is generally resistant to unfavourable conditions of drought, flood and disease. The project was started in 1950 at the Central Rice Research Institute, Cuttack, India and aims at the production of new early-maturing varieties which are suited to the tropics and combine the desirable characters of the two races.—C.L.S.

1132 COLONIAL DEVELOPMENT. **Focus on rice.** *Colon. Devel.* 1952, **1**, 26-30, illus.

A note is given on the possibilities of a hybrid rice, DS. 1, for use in the Swaziland Irrigation Scheme. DS. 1 is derived from 2 Eastern varieties, Dugan and Shali, and a small amount of seed was obtained from Hungary and multiplied. The crop is planted, irrigated and is ready for harvesting in 105 days. At harvesting the roots are left in the ground to give a second ratoon, crop which is almost as large as the first and matures in 75 days. After the second crop, the land is cultivated and a second sowing made which gives yet another crop in 105 days. The total yield from the 3 crops in 1 year is about 2.5—3 tons of clean rice per acre.—C.L.S.

1133 PIACCO, R. Le razze di riso coltivate in Italia nel 1951. [**The rice varieties grown in Italy in 1951.**] *G. Agric. Domen.* 1952, **62**, 85.

[See Abs. 792.] The position of the principal rice varieties in 1951 was as follows: Americano 1600 was grown on 63% of the total rice area; R. Bersani on 10 % of the area, followed by Maratelli (7.7 %), Arborio (5 %), Vialone Nero, Razza 77, etc. The high quality rice varieties were grown on a larger area than in 1950 at the expense mainly of Americano 1600.—E.B.O.

1134 PIACCO, R. Produzione " di fonte " nel riso. [**Production of rice seed comparable with foundation stock seed.**] *G. Agric. Domen.* 1952, **62**, 151.

Rice varieties in Italy degenerate in 5 to 10, or sometimes 50 or more years. By degeneration is meant the loss of certain characters, e.g. awnless varieties become awned, varieties resistant to brusone (*Piricularia oryzae*) become susceptible, and white varieties develop red grains (impurities of red rice in the seed excluded). Typical is the case of the variety Bertone which was very resistant to brusone in 1825 and gradually lost its resistance, so that it was described as very susceptible in 1908. Re-selection is now being undertaken for the following varieties: P.6, Balilla, Vialone, S.16, Allorio, Ardizzone, Americano, Maratelli and Bersani.—E.B.O.

1135 NISIKADO, Y. and others. **Studies on the methods for testing the effectiveness of fungicides. 2. The use of pot cultured rice plants for testing spray materials against *Helminthosporium oryzae* infection.** *Ber. Ōhara Inst. landw. Forsch.* 1951, **3**, 377-81. [Ōhara Inst. landw. Forsch., Kurashiki, Okayama, Japan]

The effectiveness of fungicides against sesame leaf spot caused by *Helminthosporium oryzae* was studied in seedling rice plants cultivated under paddy conditions, and mature rice plants, both grown in galvanized iron pots. Bordeaux mixture was effective at a concentration of less than 0.25 %; other copper preparations required from 0.5% upwards and differed very little among themselves. The results with seedling and mature plants were similar.—D.B.

1136 JACOBS, K. F. Colchicine behandeling van rijst. [**Colchicine treatment of rice.**] *Landbouwk. Tijdschr.* 1952, **64**, 155-62, bibl. 16.

A brief account is given of the effect of colchicine treatment on rice seedlings. From trials with a number of methods of treating rice seedlings and seed with colchicine, the injection of 0.25 and 0.5 % concentrations of colchicine in water just above the growing point of seedlings was effective in inducing polyploidy.—P.J.B.

1137 CADA, E. **Further observations on the occurrence and and behaviour of variations in upland rice.** *Philipp. J. Agric.* 1951, **15**, 33-45, bibl. 7.

Observations were made in the Philippines on the seed of normal stocks of Caawa II upland rice in which variants had been noted, including: (a) shortened panicles, with dense spikelets and metamorphosed leaves at the base of the rachis, (b) grain with an extra palea and, (c) twin-kernelled grain. In the case of (a), these variations did not appear in the second generation, indicating that they were physiological in nature and caused by a disturbance in the normal development of the plants; (b) and (c) were observed both in the F_1 plants from aberrant seed and in plants produced from the original stock. Two out of 8 of the flowers of plants produced from the original stock produced twin anthers and there appeared to be a relation between twinned kernels and twinned anthers. Twinned kernels germinated normally, both with and without the hull.—P.J.B.

1138 Cua, L. D. **Some observations on heading and blooming of diploid and autotetraploid rice (*Oryza sativa* L.).** *Sci. Bull. Fac. Agric. Kyushu Univ.* 1951, **13**, 1-5, bibl. 9.

Observations on heading of diploid and autotetraploid rice revealed that though the heading period of autotetraploid rice was longer and less regular than their corresponding diploid forms, the date of the first panicle emergence was the same in some varieties. In Rikuu 132, blooming of autotetraploid started 2 hours later than the diploid, reached its maximum and ceased nearly at the same time with the diploid.—Author's summary.

1139 Bordas, J. and Huguet, —. Sols de Camargue et riziculture. [**The soils of Camargue (France) and rice cultivation.**] *C. R. Acad. Agric. Fr.* 1951, **37**, 629-32.

After one year under rice the pH value of these soils is generally lowered from 9.2 to 7.9, but it is often necessary to apply great quantities of organic matter to reduce alkalinity. If irrigation and organic matter are not applied constantly, it is advisable to apply soluble Ca salts (as gypsum) on very clayey soils.—E.B.O.

1140 Food and Agriculture Organization of the United Nations. **World catalogue of genetic stocks. Rice.** Suppl. 1. Pp. 29, 1951. [Washington]

This publication is a revised version of that published in January, 1950 and embodies additional material. A tabulated list of the characteristics of each genetic stock entered is given, together with a list of all varieties included. The names of participating countries, with the genetic stocks held by each is shown.—P.J.B.

1141 Food and Agriculture Organization of the United Nations. **World catalogue of genetic stocks. Rice.** Suppl. 2. Pp. 19, 1952. [Rome]

GENERAL

1142 Sim, J. T. R. **300 years of grain growing in South Africa.** *Fmg S. Afr.* 1952, **27**, No. 312, 109-15, bibl. 18. [Stellenbosch-Elsenburg Coll. Agric.]

This is a review of published information on the development of cereal growing for grain in S. Africa during the last 3 centuries.—K.L.

1143 Hore, H. L. **Recommended cereal varieties [in Victoria].** *J. Dep. Agric. Vict.* 1952, **50**, 105-11.

1144 Schiemann, Elisabeth. Die neue Nomenklatur der Getreidearten. [**The new nomenclature of cereal species.**] *Züchter* 1949, **19**, 322-5. [Received 1952] [Deutsch. Forsch. Hochsch. Berlin-Dahlem]

The author discusses the nomenclature of species of *Triticum*, *Secale*, *Hordeum* and *Avena*.—D.B.

1145 Harrington, J. B. **Recent developments in the breeding of grain crops.** *Canad. Seed Gr. Ass. 1950-1951 Ann. Rep.* 1951, 41-53, bibl. 28.

A review is given of changes made in the list of cereal varieties recommended for Saskatchewan from 1931 to 1951, new breeding techniques, progress in breeding for disease- and insect-resistance and resistance to adverse climatic conditions. There is a brief note on recent developments in methods used for modifying the germ plasm.—P.J.B.

LEGUMES

SOYABEAN

1146 Probst, A. H. and Cutler, G. H. **Perry soybean.** *Soybean Digest* 1952, **12**, 12-13. [Purdue Agric. Expt Sta., Lafayette]

Perry is a variety recently produced by the U.S. Department of Agriculture and is adapted as a full-season variety to southern Indiana, southern Illinois, central and southern Missouri and eastern Kansas. It was developed from a Patoka × L7-1355 cross and is described as an erect-growing, yellow-seeded variety, about 3 days later in maturity than Wabash and 9 days earlier than S.100 and has consistently outyielded those varieties, both in seed and oil, where adapted. A map is given showing the latest varietal recommendations for soyabeans in the soyabean-growing areas of the USA.—P.J.B.

1147 Gordienko, V. A. [**A new variety of soyabean (*Glycine hispida*) in Moldavia.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 5, 40-2. [Moldavian State Sel. Sta.]

The new variety, Beljckaja 636, was obtained in 1947 by mass selection from the local variety Dobrudžanka, and was regionalized in the Moldavian SSR in 1951. The average yield (ctr./ha.) of Beljckaja 636 for the 4 years 1948/51 was 17.2 compared with 14.8 for Dobrudžanka: in 1950 the absolute weights of seed of the two varieties were 121.5 and 104.2 g., respectively. In Beljckaja 636 the oil content of the seeds is higher than in Dobrudžanka but the protein content is lower. Beljckaja 636 is an early-ripening, high-yielding and drought-resistant variety.—R.P.J.

1148 NITRAGIN Co., INC. Research Department. **Seed treatments and inoculation for soybeans.** *Soybean Digest* 1952, **12**, 14-16.

Trials are reported in which soyabean seed was treated with standard amounts of Arasan, Spergon and Phygon prior to inoculation with wet and dry inoculant powder. Inoculating the seed with a wet paste after the fungicidal treatments resulted in less injury to the *Rhizobia* than did inoculation with dry powder after fungicidal treatments. In both cases, the fungicides caused injury to the *Rhizobia*, but when the amount of inoculant was increased and the seed sown immediately after inoculation, nodulation was not significantly affected, as compared with seed inoculated, but not given fungicidal treatment. It is recommended that treated and inoculated seed should not be sown in dry soil and that where the inoculation is made with paste, the seed should be dried before sowing. It is pointed out that these trials were made in Wisconsin and the results may not be wholly applicable elsewhere.—P.J.B.

1149 HILDEBRAND, A. A. and KOCH, L. W. **A study of systemic infection by downy mildew of soybean with special reference to symptomatology, economic significance and control.** *Sci. Agric.* 1951, **31**, 505-18, bibl. 27. [Dom. Plant Pathol. Lab., Harrow, Ontario]

In trials during 1946-8, healthy seed and seed encrusted with oospores of *Peronospora manshurica* were treated with Spergon and Fermate, at rates of 3 and 2 oz. per bu. of seed, respectively. In all cases but one, the emergence of the treated, mildew-encrusted seed was greater than that of similar but untreated seed, the maximum increase in emergence being 20.6 %. In the case of healthy seed, in 2 out of 3 trials, an increase in emergence of treated seed of 9 to 10 % was noted, compared with similar untreated seed. From the results it was clear that oospore-encrusted seed gave rise consistently to systemically infected plants, while seed treatment virtually eliminated systemic infection. However, in only one case did treatment of mildew-infected seed subsequently raise soyabean yields, compared with those of plants grown from infected, untreated seed. The results indicated that downy mildew is not likely to become a limiting factor in soyabean production in south-western Ontario.—P.J.B.

1150 VALENCIA, P., H. Contribución al estudio de problemas foto-periódicos de la soya. [**Photoperiodic problems in the soyabean.**] *Notas agron.* 1951, **4**, 53-4, illus. [Fac. Agron. Palmira, Colombia]

[Abstract only, by G. Naundorf.] Under tropical conditions, reducing the normal 12-hr. photoperiod to 9 – 11 hr. reduced vegetative development and yield but accelerated flowering. Prolonging the photoperiod to 13 hr. by artificial illumination after dusk had no effect. Illumination between midnight and 1 a.m. stimulated vegetative growth and somewhat retarded flowering but increased yield by approximately 77%. Illumination from 1 to 2 a.m. increased yield by 62 %. Continuous illumination throughout the vegetative period greatly reduced yield.—G.M.R.

1151 IOWA Agricultural Experiment Station. Res. Bull. 384. **Nutrient uptake by soybeans on two Iowa soils.** By *L. C. Hammond* and others. 1951, 463-512, bibl. 31. [Ames]

Determinations were made of the N, P, K, Ca and Mg uptake and the rate of dry-matter production of inoculated Richland soyabeans grown on Webster silt-loam and on Clarion loam. No manurial treatment was given to the soils, but both were relatively well supplied with available nutrients, though the Clarion soil was low in available P. N was absorbed in greater amounts than any other nutrient element. On the Webster soil, which contained 184 lb. per ac. of available N, the highest rate of N uptake, 4.4 lb. per ac., daily, occurred between 94 and 101 days from sowing. During the period from 87 days after sowing to maturity at 135 days after sowing, the total N content of the seeds and pods increased by 121 lb. and the total N content of the remainder of the plants decreased by 73 lb. per ac. P was absorbed in smaller amounts than any other of the elements studied, the maximum rate of absorption being 0.35 lb. per ac. daily during the period from 80 to 87 days after sowing. The transfer of P to the reproductive parts of the plants over the period from 87 days after sowing to maturity at 135 days, closely resembled that of N. On Webster soil, the plants absorbed 56 lb. per ac. of K over the entire growth period, the time of maximum daily uptake, 1.7 lb. per ac., occurring at between 87 to 94 days after sowing. From the 80th day after sowing up to maturity at 135 days, the plants absorbed 24 lb. per ac. of K, while the K content of the seeds and pods increased by 46 lb. per ac., and that of the remainder of the plant decreased by 22 lb. At maturity, 72 % of the total K was present in the seed. At maturity, the plants had absorbed

105 lb. per ac. of Ca., the maximum rate of uptake, 2.8 lb. per ac., occurring between 73 to 80 days after sowing. There was little transference of Ca to the reproductive parts of the plants with increasing maturity. At maturity, 77 % of the total Ca was present in the leaves. The uptake of Mg was 66 lb. per ac. over the entire growth period, the maximum daily uptake of 1.5 lb. per ac. occurring between 73 and 80 days after sowing. The transfer of Mg to the seeds and pods, with increasing maturity, was negligible; at maturity, 66 % of the total Mg was in the leaves. The behaviour of the plants in respect of the different nutrient elements studied was very similar on both soils.—P.J.B.

GROUNDNUT

1152 YORK, E. J. **Research points the way to higher levels of peanut production.** *Better Crops with Plant Food* 1952, **36**, 6-12 and 47. [N. Carolina Agric. Expt Sta., Raleigh]

A review is given of cultivation and manurial practices suitable for groundnut production, based on experience at the N. Carolina Agricultural Experiment Station with large-seeded bunch and runner types. Increases in yield of shelled nuts of between 600 and 1200 lb. per ac. have been obtained by reducing row-spacing from the usual 34-42 in. to 18-24 in. No significant yield differences have been noted between plants spaced from 4 to 12 in. in the row, though a maximum of 6 to 8 in. in the row is the recommended plant-spacing to allow for insect damage and poor germination. On 75 % of soils in the main N. Carolina groundnut-producing areas, K-deficiency has been established. On soils very deficient in K, applications of 75 to 100 lb. per ac. of muriate of potash applied directly to the crop have been found desirable; on soils less deficient in K, it has been shown that it is better to apply K manure to the cotton in a cotton/groundnut rotation, rather than to apply half the amount of K to both crops. The use of leguminous cover crops in cotton/groundnut rotations has increased groundnut yields 40 % above those where no cover crop was used, this being mainly due to improved soil structure and better penetration of the soil by the gynophores. Preliminary trials have shown that certain pre-emergence herbicidal treatments may be of value for weed control. Effective weed control for 5 to 7 weeks after groundnut sowing followed pre-emergence applications of 8 or 16 lb. per ac. pentachlorophenate, 6, or 9 lb. per ac. alkanolamine salt of DNBP, or 1.5 lb. per ac. acid equivalent of the alkanolamine salt of 2,4-D. None of these treatments reduced groundnut yields, compared with untreated crops. The most suitable fungicides for seed-treatments have been Arasan, Spergon, Ceresan and Yellow Cuprocide. Groundnut leaf diseases caused by *Cercospora arachidicola* and *C. personata* have been effectively controlled by sulphur dusts containing 4 % metallic Cu applied 3 times at rates of 14 to 20 lb. dust per ac., the first application being made in early July and the remaining two at 14-day intervals thereafter.—P.J.B.

1153 OLLAGNIER, M. Les écartements dans la culture de l'arachide. [**Spacing in groundnut crops.**] *Oléagineux* 1952, **7**, 215-19, bibl. 8.

The spacing methods adopted and the spacing trials conducted with groundnuts in various countries are briefly described. These countries are: French Equatorial Africa, French West Africa, Nigeria, Belgian Congo, Tanganyika, and the USA. It is concluded that the densities generally adopted, varying from 40 to 75 thousand plants per ha., are low and that densities from 100 to 150 thousand plants per ha. give considerably higher yields. A density of 150 thousand plants per ha. on fertile soil is generally the optimum for the erect varieties which benefit more from close spacing than the creeping varieties. Close spacing ensures better control of weeds and rosette disease. [See also Abs. Nos. 459, 633 and 675.] It is explained how these higher densities can be realised in both mechanized and manual cultivation.—E.B.O.

1154 CHANDANGOUDAR, H. D. **Groundnut in the Bombay Karnatak.** *Farmer, Bombay* 1952, **3**, No. 3, 6-8.

Most of the groundnut crop grown in Bombay (Karnatak District) consists of the erect Spanish Peanut and Small Japan, which mature in about 3-5 months, and the spreading Pondicherry and Big Japan which take some 4-5 months to ripen. Two improved strains have now been evolved for distribution; they are: the erect Spanish Improved which matures a week earlier than the local varieties, gives a 10 % higher yield and is 7 % richer in oil content; and the spreading Pondicherry No. 8 which is an early strain, giving a 30 % higher yield and about 4 % more oil than the local varieties.—C.L.S.

1155 CARPENTIER, Simone. Étude morphologique et cytologique de l'action de substances fongicides ou insecticides sur la croissance de la plantule d'arachide. [**Morphological and cytological study of the action of fungicidal or insecticidal substances on the growth of the groundnut seedlings.**] *Rev. Bot. appl.* 1951, **31**, 598-605, bibl. 2, illus. [Lab. Biol. vég. Sorbonne, Paris]

The seed disinfectants Arasan, Granopera, Quinoblé S, Biormone, Verisan and a mixture of 75 % Arasan and 25% BHC (70 % γ isomer) were tested to study their effect on the growth of groundnuts, under experimental conditions, in an incubator at 25°C. and in the greenhouse, under conditions similar to those in the field. The following were the main conclusions from the incubator trials: (a) Arasan and Biormone, employed either in water suspension (1/10,000, 1/1000 or 1/500) on the seedling or as powder on the seed, had no harmful effect on plant growth; (b) Quinoblé S appeared to be toxic at a concentration of 1/1000, but was inactive when used as powder on the seed; (c) Granopera at 1/500 and Verisan at 1/1000 had an inhibitory effect on the growth of the root and stem, but had no harmful effect when used as powder on the seed; (d) the Arasan + BHC mixture, used either in water suspension at 1/1000 or as powder on the seed, had an inhibitory effect on root growth. The trial in the greenhouse showed that none of the preparations had a harmful effect on the growth of the groundnut seedling; on the contrary, the Arasan + BHC mixture appeared to stimulate growth.—E.B.O.

1156 BONNIER, C. Formation de nodosités radiculaires, sur *Arachis hypogaea* L. dans une terre dépourvue du *Rhizobium* spécifique. [**Formation of root nodules in *Arachis hypogaea* L. in soil lacking the specific *Rhizobium*.**] *Bull. Inst. agron. Gembloux* 1951, **19**, 229-30, bibl. 2, illus.

The eventual formation of nodules on soyabean, *Glycine soja*, in a soil lacking the *Rhizobium* specific to *G. soja* was attributed to adaptation. This type of adaptation was investigated in the groundnut, *A. hypogaea*, with a similar result. [See also *Fld Crop Abstr.* 4 : 401.]—D.B.

1157 PREVOT, P. and others. Diagnostic foliaire de l'arachide et équilibre des fumures. Sénégal 1951. [**The foliar diagnosis of groundnuts and the balance of fertilizers. Senegal 1951.**] *Oléagineux* 1952, **7**, 185-94 bibl. 4, illus.

[See Abs. No. 127.] Trials in which the foliar diagnosis method was applied to groundnuts to determine the manuring formulas required were continued in Senegal in 1951. Results, which confirmed as a whole those obtained previously, showed that the different soils in the trials require different manuring formulas. These are based mainly on P and secondarily on N and K. The increases in groundnut yields, obtained by applying different manuring formulas in the different regions of the trials are tabulated.—E.B.O.

PEA

1158 MELETTI, P. Reazioni istologiche in plantule di *Pisum sativum* L. trattate con ormoni. [**Histological reactions in seedlings of *Pisum sativum* L. treated with hormones.**] *Nuovo G. bot. ital.* 1951, **58**, 305-17, bibl. 7, illus., English summary pp. 316-17.

[See also Abs. 1168.] Trials were continued with seedlings of *P. sativum* treated with aqueous solutions of 2,4-D, 10 mg./l. Three different effects were obtained; growth inhibition of the primary root, abnormal enlargement of the primary root and the production of a great number of lateral roots. [From *Herb. Abstr.*]—From author's summary.

1159 WALLEN, V. R. and SKOLKO, A.J. **Activity of antibiotics against *Ascochyta pisi*.** *Canad. J. Bot.* 1951, **29**, 316-23, bibl. 21. [Bot and Plant Pathol. Div., Sci. Serv., Dept Agric., Ottawa]

Trials were carried out with a number of antibiotic substances, including antibiotic XG (isolated from *Bacillus subtilis*) and Actidione (isolated from *Streptomyces griseus*) for comparison, to determine their phytotoxicity to pea seedlings and their fungistatic activity against *A. pisi*. The most fungistatic substances were antibiotic XG, Actidione and Viridin (the last at a pH of 3.5). Actidione and antibiotic XG were the most phytotoxic of the substances tested and were the only ones to give adequate control of *A. pisi* in naturally-infected pea seed. Actidione seriously impaired the germination of the seed.—P.J.B.

1160 BRONSON, T. E. and DUDLEY, J. E. **Two systemic insecticides for the control of pea aphid.** *J. econ. Entomol.* 1951, **44**, 747-50, bibl. 7. [Entomol. and Plant Quarant. Bur., U.S. Dept Agric.]

Plots of peas were sprayed on 14 June with 1 and 0.5 lb. per ac. of octamethyl pyrophosphoramide when the plants were 5 to 6 in. high and with 1 lb. per ac. on 8 July when the plants were 20 in. high. In 21 days after the June treatments, aphid (*Macrosiphum pisi*) control was 100 % for the 1 lb. treatment and 84 % for the 0.5 lb. per ac. treatment. At 18 days after the July treatment, 96 to 100 % control was obtained, compared with untreated controls. There was no apparent foliage injury to the peas. In pot experiments, soil applications of 0.2, 0.1 and 0.05 ml. concentrations of the insecticide resulted in complete aphid control for up to 26 days, though the two highest concentrations caused leaf burning and chlorosis. In field trials, seed treatment with 500 ml. octamethyl pyrophosphoramide + 8.75 ml. gum arabic applied to 4 bu. of seed, which was sown at a rate of 4 bu. per ac., gave 79 and 42 % control at 47 and 53 days, respectively, after sowing. Similar seed treatments with 500 ml. of trialkyl thiophosphate gave 44 and 17 % control of aphid, at 47 and 53 days, respectively, after sowing, compared with controls.—P.J.B.

1161 Blanchard, M. Action d'un composé organomercurique sur le développement de l'orobanche du pois (*Orobanche speciosa* D.C.). [**The action of an organo-mercury compound on the development of broomrape of pea (*Orobanche speciosa* D.C.).**] *C. R. Acad. Sci.* 1951, **233**, 1224-6.

In the Sahel region of Algeria broomrape causes serious damage to legume crops. A laboratory trial was carried out to control this parasite with Soprasan, a silicate of methoxyethylmercury. Pea seeds were sown in pots each containing 2 kg. of sand with which broomrape seeds and different quantities of Soprasan were mixed. The pots were watered with a nutrient solution. Parasitism by broomrape is evident about 4 or 5 weeks from sowing. After 3 months from sowing results were as follows: in the pots containing Soprasan at lower rates, broomrape was present on pea but to a lesser extent than in the untreated control pot. In the pots containing Soprasan at higher rates, there was no broomrape but the growth of pea was poor. At intermediate rates of Soprasan, of about 500 to 600 mg. per pot, broomrape was absent and the peas developed normally. In field trials, Soprasan at the rate of 150 kg./ha. controlled broomrape and did not affect the pea yield.—E.B.O.

1162 van der Vaart, F. M. **The identification of pea varieties in the seedling stage.** *Euphytica* 1952, **1**, 29-33, bibl. 1. [Govt Inst. Res. Var. Fld Crops, Wageningen]

An account is given of the use of the first two scale-leaves on the first node of peas for identifying peas in the seedling stage. Illustrations are given of shadowgraphs of the first scale-leaves of a number of Dutch blue, marrowfat, dun and maple pea varieties, from which it is concluded that these scale-leaves are of value for identification purposes. —P.J.B.

1163 Crowther, E. M. and others. **Experiments on the manuring of peas.** *Agriculture, Lond.* 1952, **58**, 584-8, bibl. 5. [Home Grown Threshed Peas Joint Cttee, Peterborough, Lincs.]

Trials were carried out during 1946-9 in the pea-growing provinces of eastern England, in which applications of 0.2 and 0.4 cwt. per ac. N, 0.5 and 0.1 cwt. P_2O_5, and 0.6, 1, and 2 cwt. per ac. K_2O were made to Marrowfat and Dutch Blue peas. The N and P treatments had no significant effect on the yield of threshed peas. Applications of 0.6 cwt. per ac. K_2O raised threshed pea yields by an average of 0.6 cwt. per ac.; the 1.2 cwt. per ac. K_2O treatments did not raise the average yield higher than that following the 0.6 cwt. per ac. treatment. The yield increases following K treatment were only noted where the soils on analysis proved to be deficient in readily-available K. It is recommended that peas to be grown on soils likely to be low in K should receive about 2 cwt. per ac. of a 0-10-20 (NPK) manure. The need for combined pea and manure drills capable of placing fertilizers about 2 in. to the side and 1 in. below the pea seed is stressed.—P.J.B.

BEAN

1164 Chopinet, R. and others. Essai de classification et d'identification des principales variétés de haricots cultivées en France. [**Classification and identification of the principal varieties of haricot beans cultivated in France.**] *Rev. hort., Paris* 1950, pp. 69, bibl. 18, illus. [Received 1952] [Établ. Vilmorin, S.A., Verrières-le-Buisson]

An illustrated account is given of the morphology, physiology and reproduction of *Phaseolus vulgaris*, followed by short descriptions of 214 varieties.—D.B.

1165 Dimond, A. E. and others. **Chemotherapeutic investigations on the common bacterial blight of beans.** *Phytopathology* 1952, **42**, 72-6, bibl. 19. [Connecticut Agric. Expt Sta., New Haven]

A method of estimating the potency of chemotherapeutants for the treatment of *Xanthomonas phaseoli* by means of bioassay is detailed. The results of trials with a number of therapeutants are given.—P.J.B.

1166 Mitchell, J. W. and others. **Translocation of streptomycin in bean plants and its effect on bacterial blights.** *Science* 1952, **115**, 114-15, bibl. 6. [Plant Industry Bur., U.S. Dept Agric., Beltsville, Md]

Lanolin pastes, each containing 1% of one of 12 different antibiotic substances, were applied to the internode immediately above the cotyledons of bean plants. At the time of treatment, the trifoliate leaves were still folded in their terminal buds and the primary leaves were about 2 in. wide. Three days after applying the antibiotics, the primary leaves were inoculated with halo blight (*Pseudomonas medicaginis* var. *phaseolicola*). Only in the case of plants treated with (a) streptomycin sulphate and (b) dihydrostreptomycin sulphate was halo blight controlled; in the case of plants treated with (a) complete control was obtained. In another experiment, (a) was absorbed from the stems of plants and translocated in sufficient amounts materially to reduce the incidence of halo blight in trifoliate leaves 6 to 8 in. from the site of inoculation one week after the application of (a). Applications of 1, 3 and 9 lb. per ac. of (a) as water solutions to soil in which bean plants were growing failed to control halo blight on inoculated primary leaves.—P.J.B.

1167 Conroy, R. J. and Wilson, R. D. **Mottle leaf of Tweed Wonder beans.** *J. Aust. Inst. agric. Sci.* 1952, **18**, No. 1, 33-8, bibl. 7. [Dept Agric., Sydney, N.S.W.]

A condition occurring in Tweed Wonder beans (*Phaseolus vulgaris*), particularly in one strain known as South Coast, and which has been termed mottle leaf, resembles that described by some workers as variegation and one-sided mosaic, which are hereditary abnormalities. It also bears some resemblance to another described variegation which was considered to be cytoplasmically inherited. The condition has been shown to be seed-transmitted but the evidence so far obtained has not elucidated the exact nature of this transmission, the problem being complicated by variation in symptom manifestation, which is possibly influenced by environmental factors. Evidence from one small experiment suggests that mottle leaf reduces the seed yield of plants.—From authors' summary.

1168 Meletti, P. Reazioni istologiche in piante di *Vicia faba* L. trattate con 2,4-D. [**Histological reactions in plants of *Vicia faba* L. treated with 2,4-D.**] *Nuovo G. bot. ital.* 1951, **58**, 318-36, bibl. 23, illus., English summary p. 225.

Leaves and stems of *Vicia faba* plants, grown in light or darkness under different conditions of moisture and temperature, were treated with 2,4-D at different concentrations in lanolin. Among the many reactions obtained were: stem curvature, tumour formation in decapitated stems, hypertrophical phenomena in the stem, and leaf curl. Environmental conditions, plant age and concentration of 2,4-D in lanolin influenced the rate and intensity of these reactions. [See also Abs. 1158.]—From author's summary.

1169 Tombesi, L. and Venezian, Maria Elisa. Attività ossidasica, catalasica e carboanidrasica e contenuto in glutatione ossidato/ridotto in relazione alla simbiosi batterica delle leguminose. Nota 2. [**Oxidase, catalase and carboanidrase activities and oxidated/reduced glutathione content in relation to bacterial symbiosis in the Leguminosae. Note 2.**] *Ann. Sper. agr.* 1952, **6**, 481-97, bibl. 7, illus., English summary p. 496. [Sta. chim.-agr. sper., Roma]

See *Fld Crop Abstr.* 4 : 119.] The investigation was ontinued on leaves and root nodules of *Vicia faba*. —E.B.O.

ROOTS

UGAR-BEET

170 Grøntved, P. Sommeraftopning af bederoer. [**Summer topping of beet crops.**] *Ugeskr. Landm.* 1952, **97**, 135-7.

Following the results of trials in Michigan, USA, in which the topping of sugar-beet to within 3 to 6 cm. of the root-crown in midsummer resulted in only small reductions in root yield, but large increases in total yields of tops, trials were laid down to determine the effect on the total yields of roots and tops under Danish conditions of carrying out such topping twice in the season. Over 100 trials were carried out in 1951, during which year growing conditions were very favourable. In 9 trials at State Experimental Stations, the topping of sugar-beet in summer reduced total dry-matter yields at harvest by an average of 46.7 hkg. per ha., representing a yield reduction in the roots, alone, of 4.2 %, compared with sugar-beet topped at the normal time at harvest. In 2 trials, the total yield of true protein increased by 91 kg. per ha., compared with normally harvested crops. In 100 local trials at a wide range of locations in Denmark, summer topping reduced total dry-matter yields by an average of 39.4 hkg. per ha., or by 25 % of the total yields of normally topped crops, though the total dry-matter yields of the tops were increased by 7 % by topping in summer. Summer topping is not recommended for Danish conditions as a means of obtaining greater yields of stock feed.—P.J.B.

1171 Harvey, P. **Saving labour with rubbed sugar-beet seed.** *Brit. Sug. Beet Rev.* 1952, **20**, 103-8. [Norfolk Agric. Sta., Sprowston]

Trials at Sprowston and in other parts of Great Britain have shown that useful savings in singling-time have been made by the use of rubbed seed, graded between 7/64 and 9/64 of an inch. The average of 28 trials showed that large rubbed seed gave 1000 fewer plants per ac. than normal seed and increased the speed of singling by 8%. Small rubbed seed gave an additional saving of 12 % in singling time (i.e. 20% in all) for a further reduction of 1000 plants per ac. Evidence suggests that vigour of growth in the seedling stage is reduced following rubbing but this initial disadvantage is made up during the season so that the ultimate yield is unaffected. [See Abs. 152.]—K.L.

1172 Heinisch, O. Probleme des Rübensamenbaues. [**Problems of beet (*Beta* Spp.) seed production.**] *Dtsch. Landw.* 1951, **2**, 193-9, bibl. 19, illus. [Leipzig]

Special attention is paid to methods of storing the stecklings.—G.M.R.

1173 Serbin, S. S. [**The reaction to a high level of nutrition of sugar-beet plants differing in vigour.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 2, 62-5. [All-Union Sci. Res. Inst. Sugar Beet]

In pot and field experiments, sugar-beet plants originating from one and the same seed ball exhibited different rates of growth from the beginning of germination. Seedlings originating from the largest seeds made the greatest growth. Dissimilar growth was also noted in seedlings from one-, two-, three- and four-seeded seed balls. The results of the experiments indicated that those seeds which have a large supply of nutritive substances produce larger seedlings, which grow more intensively both in the initial and subsequent phases of development. Pot experiments showed that the plants which appeared more vigorous at the beginning of growth (the large seedlings) also gave a higher yield than the less vigorous plants. Supplementary manuring of large seedlings with N, P, and K increased the weight of the root by 15.6 %, while in small seedlings under the same conditions the increase in weight of the root was 2.6 %. In addition, the roots produced by large seedlings had a higher sugar-content than those produced by small seedlings.—R.P.J.

1174 THÉNARD, J. and MALLMANN, R. J. de. La protection des semences segmentées de betteraves contre les larves de taupins au moyen de traitements insecticides. [**The protection of segmented sugar-beet seed against wireworm by means of insecticides.**] *C. R. Acad. Agric. Fr.* 1951, **37**, 602-5, bibl. 13.

A powder containing a mixture of an organic-mercury compound and the gamma isomer of BHC are effective in treating segmented sugar-beet seed against wireworm without damage to the plant. The composition of the powder, the rate of application, the number of germinated plants and the density of sap in the roots at harvest are tabulated.—D.B.

1175 BALDONI, R. and CANOVA, A. Un metodo per il rapido riconoscimento dei semi di barbabietola infettati da *Phoma betae* (Oud.) Frank. [**A quick method for detecting sugar-beet seeds infected by *Phoma betae* Oud.) Frank.**] *Ann. Sper. agr.* 1952, **6**, 435-42, English summary pp. 441-2.

In the new method described, the sugar-beet seed-clusters are placed in Petri dishes on agar-agar with pieces of dry, sterile lucerne leaves and then incubated for 8 days at 20°C. *Ph. betae,* which multiplies abundantly on lucerne leaves, can be detected easily by examining the dishes against a light.—E.B.O.

1176 BALDONI, R. Prove di lotta contro la cercospora della bietola. [**Trials in controlling *Cercospora beticola* on sugar-beet.**] *Industr. saccar. ital.* 1952, **45**, 14-20, bibl. 48. [Ist. Agron. Univ. Bologna, Italy]

Cercospora beticola leaf spot is endemic on sugar-beet crops in Italy where it causes serious damage every year. This damage is often partly concealed by the even greater damage caused by summer drought. Compared with many foreign varieties, the Italian sugar-beet varieties are partly resistant to *C. beticola.* Control measures in Italy are mainly directed towards obtaining resistant varieties, but in the last few years control by fungicides has been studied. A preliminary trial was conducted in central Italy in 1951 to control *C. beticola* on an irrigated sugar-beet crop of the variety Klein E using copper oxychloride and copper oxide in a water suspension. Six and 2 applications of each preparation were tested. Results from this trial indicated that : (a) treatment with the above preparations increased yield, the oxychloride being more effective than the oxide and 6 applications more effective than 2; (b) compared with the untreated control plot, 6 applications of copper oxychloride gave the following average increases in q./ha. : roots 100, leaves and crown 55, sugar 24, the value of the total increase being 10 times the cost of the treatment ; (c) the appropriate time to start applying the fungicide appeared to be the end of June, when day temperatures reach 28 to 30°C., the optimum for the development of *C. beticola* ; (d) there was an advantage, as regards sugar production, in lifting the treated crop at a later date than the untreated crop. The fact that this trial was conducted with a non-resistant sugar-beet variety, grown under irrigation, was partly responsible for the high increase in yield obtained by fungicidal treatment.—E.B.O.

1177 GHIDINI, G. M. Il cleono della bietola e l'estendersi della sua area di distribuzione. [***Cleonus* on sugar-beet and the increase of its area of distribution (in Italy).**] *Industr. saccar. ital.* 1952, **45**, 23-5.

The control of insect pests of sugar-beet, particularly *Cleonus*, has recently been made compulsory in Italy. Italian species of Curculionidae, under the name of "cleono", are indicated, of which the most noxious to sugar-beet crops are *Conorryncus luigionii*, present in Sicily, Sardinia and southern Italy, and *Temnorhinus mendicus*, present in central and northern Italy. Up to a few years ago, *T. mendicus* was unknown north of the watershed of the Apennines. It has now spread in many regions of the Po Valley, south of the Po.—E.B.O.

1178 STONE, M. W. and FOLEY, F. B. **Field tests with ethylene chlorobromide on wireworms.** *J. econ. Entomol.* 1951, **44**, 711-13. [Entomol. and Plant Quarant. Bur., U.S. Dept Agric.]

Trials were carried out to compare ethylene chlorobromide with ethylene dibromide as fumigants for the control of the sugar-beet wireworm (*Limonius *californicus*) in California. Each fumigant was applied to wireworm-infested soil at a rate of 8.3 gal. per ac. at a depth of 7 in. in rows 12 in. apart. Ethylene chlorobromide gave a kill of 85 %, compared with 96 % for ethlyene dibromide. In a further trial on Yolo sandy loam, applications of 11 and 22 gal. of ethylene chlorobromide and 11 gal. per ac. of ethylene dibromide were made. The 11 gal. per ac. ethylene chlorobromide was ineffective against wireworms, while the 22 gal. treatment gave very good control at all depths. The 11 gal. per ac. ethylene dibromide treatment was only slightly less effective than the 22 gal. ethylene chlorobromide treatment. The soil moisture content of the plots in this trial varied from 14 % at 4 in. deep, to 18 % at 16 in. deep. Soil temperatures at the time of treatment were 70°F. at the 4 in. depth and 66°F. at the 8 and 12 in. depths.—P.J.B.

1179 HULL, R. **Virus yellows of sugar beet and mangolds.** *J. Inst. corn. agric. Mer., Ltd.* 1951, **3**, 25-8. [Rothamsted Expt Sta., Harpenden]

Although there is no control measure which will prevent the disease (carried by the aphids *Myzus persicae* and *Aphis fabae*), several factors may reduce the attack. Early sowing of sugar-beet, high soil fertility, and a plant population of 25 to 30 thousand plants per acre favour heavy yields of roots, despite early infection by the virus. For the seed crop, some protection from aphids may be obtained by undersowing stecklings in a barley crop in April, or by spraying the open crop with one of the new systemic and persistent insecticides [names not given]. The best method of producing virus-free stecklings is to grow them in districts that are relatively free from virus and aphids [for example the north and north-west of England and Scotland]. As mangold clamps are an important source of virus infection, all mangolds should be consumed by the end of March to prevent re-infestation of other crops.—K.L.

1180 SOCIÉTÉ VILMORIN-ANDRIEUX. Recherches sur la précocité chez la betterave à sucre. [**Investigations on earliness in the sugar-beet.**] By *A. F. Bilquez* and *N. Bilquez.* Pp. 2, 1951.

This is a preliminary note on the selection of sugar-beet on the basis of foliage development. The development of the three successive bunches of foliage, each of which corresponds with a stage of development of the whole plant, is an individual, and hereditary physiological character. Plants which are in the third stage of foliage development by a given date are classed as early; those in which the foliage is in the second stage at this same date are classed as late. Plants so classified are studied for agronomic characters and industrial use.—D.B.

1181 ULRICH, A. **The influence of temperature and light factors on the growth and development of sugar beets in controlled climatic environments.** *Agron. J.* 1952, **44**, 66-73, bibl. 14. [Plant Nutr. Div., California Univ., Berkeley]

The results of studies on sugar-beet grown in controlled climates indicated that in the course of normal development, top growth takes precedence over storage-root development until the sugar content of the storage root exceeds a value ranging between 4 and 8 % In conditions of favourable climate, day length and soil-nutrient status, the sucrose produced in excess of the respiratory and top-growth requirements is primarily devoted to increasing the size of the storage roots and the sucrose content of the root does not rise appreciably. In the experiments in controlled, favourable climates, the sucrose content of the roots did not exceed 12 %, a value much lower than that found in sugar-beet grown in the field. It is deduced from this fact that sugar-beet has no self-regulating mechanism for sucrose accumulation, but depends upon external stimuli, such as climatic variation, especially a reduction in mean night temperatures, together with N-deficiency, which initiates maturation. The optimum night temperature for maximum sucrose accumulation was lower than that for maximum storage-root growth. [See also Abs. 159.]—P.J.B.

1182 BUCHNER, A. Zur Stickstoffdüngung der Zückerrüben. [**Nitrogen manuring of sugar-beet.**] *Landw. Forsch.* 1951, **3**, 7-16, bibl. 38. [Badische Anilin- und Sodafabrik, Limburgerhof, (Pfalz)]

The sugar-beet crop makes heavy demands on the nitrogen supply of the soil, yet if too much nitrogen is available the crop is poor in quality. As a contribution towards solving the problem of nitrogen manuring of sugar-beet, results of long-term experiments (1927-44) have been examined to see how far yields can be raised by increasing nitrogen, without at the same time causing deterioration in quality (increased water content, decreased sugar content). The material, collected in 11 tables, shows the effect of increasing nitrogen supply (in amounts varying between 40 and 160 kg./ha.) on yield and sugar content of the root and on yield and protein content of the foliage.—D.B.

1183 DONÀ dalle ROSE, A. Calciocianamide localizzata alla barbabietola zuccherina. [**Placement of calcium cyanamide for sugar-beet.**] *G. Agric. Domen.* 1952, **62**, 157. [Sta. sper. Bieticolt., Rovigo, Italy]

Results are given of a trial, carried out in 1952, which indicated that calcium cyanamide, both in granular and powder form, is harmful to sugar-beet crops when placed beside the seed. This fertilizer should be broadcast.—E.B.O.

1184 Garner, H. V. **A fertilizer policy for sugar-beet.** *Brit. Sug. Beet Rev.* 1952, **20**, 109-13. [Rothamsted Expt Sta.]

In this general review of the fertilizer position, the merits of agricultural salt, nitrate of soda, lime and compound fertilizers for sugar-beet are discussed.—K.L.

1185 Owens, H. S. and others. **Production and utilization of sugar beets.** *Econ. Bot.* 1951, **5**, 348-66, bibl. 42. [West. Reg. Res. Lab., Albany, Calif.]

A review is given of the breeding, world production and processing of sugar-beet, with particular reference to practices used in USA.—P.J.B.

TURNIP

1186 Birk, L. A. and Oughton, J. G. **Parathion residues on swede turnips.** *Sci. Agric.* 1952, **32**, 52-6, bibl. 5. [Ontario Agric. Coll., Guelph]

In 1949, 4 weekly spray applications to swede turnips (*Brassica napus* var. *napobrassica*) of 1 lb. of 15 % wettable Parathion powder per ac. resulted in residues of 0.21 ppm in the peel 9 days after treatment. In 1950, similar applications made bi-weekly resulted in residues of 0.10 ppm of Parathion in the peel and 0.02 ppm in the foliage. In 1949, two 10 lb. applications of Parathion 9 days apart resulted in a residue of 1.21 ppm in the peel 9 days after the last treatment.—From authors' summary.

POTATO

1187 Gzelidze, A. M. [**Spring planting of potatoes under a cover crop of maize.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 5, 78. [Gruzian State Sel. Sta.]

In experiments in 1951, when potatoes were planted in pure stands the weight of the tubers varied from 50 to 100 g., and the yield was 10 ctr./ha.; when planted under a cover crop of maize, the weight of the tubers varied from 200 to 250 g., and the yield was 25 ctr./ha.—R.P.J.

1188 Boyd, A. E. W. **Potato haulm destruction—the position in Scotland.** *Scot. J. Agric.* 1952, **31**, No. 4, 204-7, bibl. 4. [Edinb. and E. Scot. Coll. Agric.]

An account is given of the chemical compounds and mechanical methods used for destroying potato haulm in Scotland.—K.L.

1189 Plant Pathology. **Trials of substitutes for sulphuric acid for potato haulm killing.** *Plant Pathol.* 1952, **1**, 2-9, bibl. 1, illus.

This contribution from conferences of crop husbandry officers and plant pathologists of the Nat. Agric. Advisory Serv., gives an account of trials carried out at 11 centres in England and Wales, in 1951, to compare the efficacy of sulphuric acid, sodium chlorate, sodium arsenite, a tar-acid emulsion (TAC 49) and a tar-oil fraction (TOF 54), under varying local conditions, for the destruction of potato haulm. At all 11 centres assessment of the percentage-kill of stems and leaves was made for each treatment at 1, 5 and 14 days after application. Results are given separately for each centre. There was some variation from centre to centre in the rapidity with which the 5 preparations tested killed the leaves and stems, but taking the centres as a whole the preparations were placed in the following groups of decreasing efficacy; (a) high or low volume sulphuric acid, (b) low volume TOF 54 and high volume sodium arsenite and (c) high volume TAC 49 and high volume sodium chlorate. Sulphuric acid gave an almost immediate kill of the leaves and a kill of the stems which was almost complete 14 days after treatment. From observations on the control of weeds by the chemicals, made at Rothamsted and other centres, it appeared that the effect of treatment on weed control was of the same order as that of their kill of potato haulm. Trials of mechanical haulm destruction, which were also carried out, showed that this operation could be done easily by the farmer himself at about half the cost of spraying with acid.—E.B.O.

1190 Cunningham, C. E. and others. **Potato vine [haulm] killing methods as related to rate of kill, vascular discoloration and virus disease spread.** *Amer. Potato J.* 1952, **29**, 8-16, bibl. 16, illus. [Maine Agric. Expt Sta., Orono]

The effect of various haulm-killing methods on 5 varieties of potatoes was studied during 1948-50. All the varieties were killed more easily as they matured. Later-maturing varieties were more difficult to kill than the earlier-maturing. Of the chemicals used, the dinitro compounds and tar acids gave the most rapid rate of kill, the arsenicals an intermediate rate, and cyanamid aero-defoliant a relatively slow rate of kill. The greatest amount of tuber discoloration occurred in the early-maturing varieties. With the exception of the roto-beater and hand-pulling, those materials or methods that killed the haulms most rapidly tended to produce the greatest amount of vascular discoloration. The amount of vascular discoloration produced by haulm-killing tended to increase with age of the plants until the plants were maturing rapidly, at which time there was a decline in the amount of discoloration. No appreciable fading or increase in vascular discoloration was detected in tubers during storage of 5 varieties at 37° and 50°F. when examined in November and February. The amount of discoloration did not appear to increase or fade in tubers of the Irish Cobbler variety when examined at intervals of 1 and 2 weeks after application of the material. Rotobeating potato haulms, followed by a chemical spray, reduced the spread of the leafroll virus, as compared with rotobeating alone or chemical haulm-killing alone.—From authors' summary.

1191 PAGE, J. O. **Potatoes for crisp-making.** *Agriculture, Lond.* 1952, **58**, 525-7. [NAAS, Boston, Lincs.]

The characteristics conducive to good crisping quality in processed potatoes are reviewed, with particular reference to sugar content and the effect of storage temperature on this factor. A note is given on the use of a specific gravity test for evaluating the crisping quality of potatoes. Soils best suited for producing potatoes for crisp-making are the red soils and those with a fairly high clay content; black-fen, sandy, or limestone soils are unsuited. To produce the high starch content necessary for good crisping qualities, a high K status in the soil is required. Best suited varieties are: Duke of York, Bintje, Record, Doon Star and Conference, followed by Home Guard, Great Scot, Dr. McIntosh, King Edward, Gladstone and Arran Peak.—P.J.B.

1192 SWEDEN. Royal Agricultural College. Institute of Plant Husbandry. Publ No. 5. Potatissorterna i Sverige. [**Potato varieties in Sweden.**] By *N. O. Hagberth.* 1951, pp. 192, English summary pp. 190-1. [Uppsala]

The results are given of an extensive survey during 1937-43 of the distribution of different potato varieties in the Swedish provinces, carried out to provide a reliable basis for an attempt to raise the yield of potatoes and improve stocks. Altogether, 220 varieties were recognized in the survey, though most were unimportant and many were of inferior character and the samples often very mixed. Magnum Bonum was the most widely grown variety; Prof. Wohltmann, President, Up-to-date, Birgitta and Gloria were also commonly grown. Among first-earlies, Early Puritan and Early Rose were the most widely grown. The results of this survey were regarded as rather discouraging; an improvement in the purity of stocks and the limiting of varieties to those of most value in Sweden is regarded as a feasible and necessary aim in the future.—P.J.B.

1193 JARDOUX, R. Une vieille variété française: Belle de Fontenay. [**Belle de Fontenay, an old French (potato) variety.**] *Pomme de terre fr.* 1952, **15**, No. 149, 6-9.

Information is given on the history, cultural requirements, "seed" production and "hair sprout" disease of this variety. Its vegetative cycle is 75 days.—E.B.O.

1194 POMME de TERRE FRANÇAISE. Nouvelles variétés françaises inscrites au catalogue. [**New French (potato) varieties entered in the catalogue.**] *Pomme de terre fr.* 1952, **15**, No. 151, 24.

Aryo, Bonatou and Aura are new potato varieties entered in 1951 in the French catalogue of species and varieties. The other new potato varieties, entered since the end of the last war, are: Arvor, B.F. 15, Hermine, Hyva, Ker Pondy, Nova, Pevéloise, Roseval, Rondine and Solanum.—E.B.O.

1195 MONOT, G. Essais en Amérique du sud. [**Trials (with potatoes) in South America.**] *Pomme de terre fr.* 1952, **15**, 3-5.

In 1-year trials (1950-51) carried out in Argentina, several European potato varieties yielded more than the control, Katahdin. The French potato varieties Bonatou, Industrie, Ker Pondy, Vedette and Voran appeared to be capable of becoming acclimatized in Argentina. The principal advantages of European varieties over American varieties are given as: better yield, better keeping qualities and stronger vegetative development.—E.B.O.

1196 AKELEY, R. V. and others. **Blight-resistant potato varieties can save copper and cut cost of production.** *Amer. Potato J.* 1952, **29**, 49-52, bibl. 1. [Bur. Plant Industry, Soils and agric. Engng, Beltsville, Md]

Kennebec, Pungo, Cherokee, Essex, Ashworth and some other potato varieties, released in the USA in recent years, are highly resistant to the late blight fungus, *Phytophthora infestans.* It is thought that if all the potato acreage in the USA were planted to blight resistant potato varieties, much of the 50 million lb. of copper sulphate, which is estimated to be used to control blight, could be saved. Results from 2 years' trials in which Bordeaux mixture and DDT were tested in Maine on several potato varieties grown in plots inoculated with the late blight fungus, indicated that: (a) Kennebec yielded satisfactorily without fungicide spray, Bordeaux mixture having proved of no value on this variety; (b) the fungicide spray increased the yield of the blight susceptible varieties; and (c) DDT sprays increased the yield of all the varieties by controlling insects.—E.B.O.

1197 JAŠČUK, A. P. [**Concerning the responsiveness of canker-resistant varieties of potatoes (*Solanum tuberosum*) to manuring.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 2, 57-62. [Kiev Expt Sta., All-Union Sci. Res. Inst. Sugar Industry]

Results are reported of experiments conducted during 1949-50 with canker-resistant potato varieties suitable for the Ukrainian SSR. One early-ripening variety was included, Oktjabrenok, one medium-early variety, Grencmark, and two lateipening varieties, Ostbote and Karnea. The variety which gave the highest yield with increasing doses of organic and mineral manures was Grencmark, followed by Karnea, Oktjabrenok and Ostbote. Karnea gave the largest yield of starch with all the manurings. With increased manuring there was a sharp decline in the number of small tubers in the yields of the varieties Grencmark and Oktjabrenok. Of the varieties investigated, Grencmark and Karnea possess the greatest potential possibility for increased yield with improved agrotechnique. A marked decline in starch content occurrs when increased doses of nitrogenous fertilizers are applied jointly with potassium fertilizers containing chlorine.—R.P.J.

1198 ZUEREVA, P. A. [**New frost-resistant potato hybrids.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 4, 35-7. [Inst. Arctic Agric. and Anim. Breed.]

Vegetative hybridization (by double grafting) between the wild variety *Solanum schreiterei* (one of the *S. acaule* group) and cultivated varieties of potato resulted in the production of a hybrid, G-2, which was frost-resistant and gave a high yield of large-sized tubers. G-2 crosses easily with different varieties, giving rise to hybrids which possess increased disease resistance, and surpass some standdard varieties (e.g. Rannaja Roza, Voljtman and Lorh) in yield, starch content and earliness of ripening.—R.P.J.

1199 ABERYSTWYTH, University College of Wales. Department of Agricultural Economics. **Seed potato growing. (Costs and returns, 1950).** By *A. M. Morgan Rees* and *M. H. Dummer*. Pp. 22, 1952.

This report provides a short account of the costs and returns relating to the 1950 seed potato crop on 25 farms in Breconshire and 4 in Radnorshire. These results are compared with those from an identical sample of farms for the 2 yr.-period 1949-50.—K.L.

1200 SCOTLAND Department of Agriculture. **Seed potatoes. The maintenance of pure, healthy and vigorous stocks.** Pp. 107, illus., Edinburgh ; H.M.S.O., 1952.

This bulletin supplies the grower with detailed information on: varietal characters, variations, abnormal growth forms, diseases, pests and disorders and the spraying of potatoes intended for seed.—K.L.

1201 MONTALDO, B. A. Producción de semilla de papa. [**Production of seed potatoes.**] *Agric. téc., Chile* 1950, **10**, 32-42, English summary p. 42. [Dept Invest. agric., Minist. Agric., Chile]

Seed potato production in Chile is poor because of infection by *Actinomyces scabies*, *Spongospora subterranea*, and *Heterodera marioni*, but in this respect potatoes from the Island of Chiloe and neighbouring islands are much better than those produced farther north. Eight years' trials of introduced varieties at the Centinela Experiment Station, Puerto Octay, Chile, show President, Alpha and Industry to be the highest yielding, followed by Corahila, Irish Cobbler, Majestic and Treff-As. Some of the Station's own promising selections are described.—G.M.R.

1202 KIBIZOV, V. P. [**Method of determining the quality of seed potatoes.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 4, 77-8, bibl. in text. [North Osetinskaja State Sel. Sta.]

In evaluating the quality of seed potatoes it is necessary, side by side with tuber analysis based on external characters, to "sprout" the tubers and examine the shoots. Before planting, the degree of degeneration should be determined, and if the percentage is high, the potatoes should not be used as seed material. In planting potatoes from spring-sown crops, it is necessary to increase the planting rate according to the number of tubers with filiform shoots.—R.P.J.

1203 JEHLE, R. A. and others. **Early home-grown seed for planting the late potato crop in Maryland.** *Amer. Potato J.* 1952, **29**, 1-7, bibl. 6. [Maryland Univ. Agric. Expt Sta., College Park]

Tubers from early-grown seed of certain potato varieties can be used successfully to plant the late potato crop on the Maryland Eastern Shore. Certain chemical treatments of cut seed pieces to hasten sprouting sometimes increase stands and yields, and have resulted in causing the plants to come up more evenly and produce tubers of larger average size and earlier maturity. The most successful results have been obtained with the Marygold variety. Warba also gave good results. Results with Irish Cobbler were always very poor. Best results were obtained when the seed pieces were planted in cool moist soil. Planting in hot dry soil should be avoided. Ammonium thiocyanate, sodium thiocyanate, ethylene chlorhydrin and thiourea hastened sprouting, but ammonium thiocyanate seemed to be somewhat preferable to the others. Results from 0.75 % solutions were just as good as from 1% solutions and soaking the cut seed pieces for 5 min. in the solution gave just as good results as soaking them 10 min. or 1 hr. No difference in stands and yields resulted when the seed pieces were treated the day they were planted or the day before planting, except when ethylene chlorhydrin was combined with Nabam, in which case the treatment the day prior to planting caused injury. Nabam, Thiram, Zineb or Spergon, either as dusts or liquids, following treatment to hasten sprouting did not increase yield or stand. Combining Nabam, Zineb or Thiram with ammonium thiocyanate or ethylene chlorhydrin did not modify the effect of the sprout-hastening chemicals and did not increase yield or stand. Spergon, following treatment to hasten sprouting, reduced yield and stand.—From authors' summary.

1204 ŠKVARNIKOV, P. K. [**Summer planting of newly harvested potato tubers in the Crimea.**] [Russian] *Izv. Akad. Nauk SSSR* Ser. Biol. 1952, No. 1, 36-62, bibl. 16. [Dept Geob. Plant Industr. Crim. Branch Sta. Akad. Sci. SSSR, Simferopol]

In the Crimea province, the quality of seed potato tubers harvested in autumn for planting in the following summer is impaired by the protracted storage period (8 to 9 months) and low winter temperatures. The investigations reported indicate that chemical treatment of newly-harvested young tubers accelerates germination, particularly of early-ripening varieties. By planting in summer newly-harvested tubers, particularly those which had been subjected to chemical treatment, growth and development of the plants during the growing period, and also the formation of tubers, proceeded normally. These plants had a fresher and healthier appearance than those of the same varieties produced by tubers which had been stored since the previous autumn, and gave a higher yield of tubers than the latter. The yield in tons/ha. from freshly harvested tubers of Rannjaja Roza varied from 11.6 to 12, of Kurjer from 6.4 to 8, of Uljjanovskiĭ from 7.6 to 8, and of Lorh from 5 to 11.3, whereas the yield of Rannjaja Roza was about 10 and that of Lorh from 3 to 4.9 from plots planted with seed stored in the usual way. The total yield in tons/ha. (from spring and summer plantings) with double-crop cultivation was: Rannjaja Roza 32.5 to 37.6; Kurjer 16.5 to 34; Uljjanovskiĭ 30.4 to 31.8, and Lorh 26.7 to 27.5.—R.P.J.

1205 van HIELE, F. J. H. Onkruidschade bij aardappeken in verband met het groeistadium. [**The relation between the growth stage of potatoes and competition by weeds.**] *Maandbl. LandbVoorlDnst.* 1952, **9**, 20-7, bibl. 9. [Crop Husb. Lab., Wageningen]

Studies were made of the effect on potato yields of permitting weed growth in the crop during the early stages of the growth of potatoes. Where weeds were permitted to grow during the first month after planting, tuber yields were reduced by an average of 20 %, compared with controls in which no weeds were allowed to grow during the entire growing season. Where all weed control was omitted throughout the growth of the potatoes, yields were reduced by 30 %, compared with controls weeded for the first month only after planting. In other trials where applications of 46 kg. N and 28 kg. P_2O_5 per ha. were made at the time of planting, the yield reductions caused by weed growth were largely eliminated.—P.J.B.

1206 GASSNER, G. and GRIMM, H. Über die Wirkung von Kupferkalkspritzungen auf Ertrag und Stärkegehalt der Kartoffeln. [**The effect of spraying with Bordeaux mixture on yield and starch content of potatoes.**] *Angew. Bot.* 1952, **26**, 60-8, bibl. 9, illus.

The assumption that the spraying of potatoes with Bordeaux mixture increased the yield of potatoes when not infected with *Phytophthora* was not confirmed. On the contrary, since relatively small quantities are harmful, Bordeaux mixture should be used only when the first signs of infection appear and not as a preventative.—D.B.

1207 GUILLEMAT, J. and others. Essais de fongicides contre la fusariose de la pomme de terre. [**Fungicidal trials to control *Fusarium caeruleum* on potato.**] *Pomme de terre fr.* 1952, **15**, 3-9.

A comparative trial was carried out in 1950 to test several fungicidal preparations on the potato, variety Bintje. The experimental potatoes were wounded and infected artificially with *F. caeruleum*. All the preparations tested reduced, but none stopped completely, the penetration of the mycelium into the tubers. These preparations, in decreasing order of effectiveness were: Puratized, Rhizoctan B, 1.080, 1.020, Phygon, Fusarex and Dithane. Artificial wounding appeared to favour considerably the development of the fungus. Of the preparations tested, Puratized only was found to be toxic to potatoes.—E.B.O.

1208 VENTURI, F. La tignola delle patate ed i mezzi che permettono di combatterla. [**Potato moth and its control.**] *Agric. toscana* 1951, **6**, 258-60.

To control this pest [*Gnorimoschema operculella*], which multiplies both in the field and the storehouse, it is advisable: (a) not to grow a succession of crops of potatoes, or contiguous crops of other Solanaceae, such as tobacco and tomatoes, which are hosts of this insect; (b) to burn all residues from Solanaceae; (c) to avoid storing potatoes in the field after harvest; and (d) to dust storehouses, where seed potatoes are kept, with DDT preparations.—E.B.O.

1209 SASSER, J. N. **Studies on the control of golden nematode of potatoes with Systox spray (E-1059), an organic phosphate insecticide.** *Plant Dis. Rep.* 1951, **35**, 152-5, bibl. 7. [Nematol. Div., U.S. Dept Agric.]

In trials *in vitro* with Systox, a German product, concentrations of 0.25, 0.5, 1 and 2 % of Systox in water inhibited larval migration from golden nematode (*Heterodera rostochiensis*) cysts. Concentrations of 0.25 and 0.5 % of Systox were ineffective in killing golden nemotode larvae after 1 day's exposure, while 2 % solutions resulted in a complete kill. Potato seed-pieces soaked in concentrations of 0.01, 0.03, 0.1, 0.25, 0.5, 1 and 2 % of Systox had very poor germination. The phytotoxicity of 1 % Systox foliage sprays to potato plants was very pronounced. Soil-drench treatments with solutions of 0.03 to 2 % Systox were ineffective against golden nematode and reduced potato growth. It is concluded that Systox is ineffective against golden nematode. Soil-drench trials with concentrations of Systox as low as 0.03 % gave good root-knot nematode (*Meloidogyne* spp.) control, but damaged tomato seedlings sown 1 week after the soil treatment.—P.J.B.

1210 WALLIS, R. L. **Cull-potato piles as breeding places for the potato psyllid and tuber flea beetle.** *Amer. Potato J.* 1952, **29**, 17-22, bibl. 2. [U.S. Dept Agric., Bur. Entomol. and Plant Quarant., Scottsbluff, Nebr.]

Potato tubers, unsuitable for the market and dumped on waste land in spring, sprout and produce foliage in which insects, primarily the potato psyllid (*Paratrioza cockerelli*) and the tuber flea beetle (*Epitrix tuberis*) breed during spring and early summer and later move to cultivated crops. Trials were conducted during 1946-9 to test various methods of preventing or controlling the growth of potato sprouts in cull piles. These methods included treatment with herbicides and sprout-inhibitors, burning, burial and cutting. It appeared that the easiest and cheapest method was to spread out the tubers in a single layer on the soil so that they were killed by exposure to the elements before they sprouted. The other methods tested were too expensive or ineffective.—E.B.O.

1211 POMME de TERRE FRANÇAISE. Le problème des pucerons. [**The aphid problem.**] *Pomme de terre fr.* 1952, **15**, No. 151, 11-18, bibl. 31.

A brief review is given of methods, mainly chemical, for controlling aphids, which are carriers of the principal virus diseases of potatoes, the most common aphids being *Myzus persicae*, *Macrosiphum euphorbiae*, *M. solanifolii* and *Doralis rhamni*.—E.B.O.

1212 LIMASSET, P. Le contrôle sérologique en 1951. [**Serological control** [**on potatoes**] **in 1951.**] *Pomme de terre fr.* 1952, **15**, No. 153, 3-5.

An account is given of the work carried out in France in 1951 to control virus diseases in potatoes by detecting affected lots by means of serum diagnosis.—E.B.O.

1213 COÏC, Y. and de BAISSÉ, G. Manganese et filosité de la pomme de terre. [**Manganese and spindling or hair sprout in potatoes.**] *C. R. Acad. Agric. Fr.* 1951, **37**, No. 7, 278-81, bibl. 7.

Analyses of normal and spindling tubers from various sources led to the conclusion that Mn deficiency in the tuber cannot be held responsible for hair sprout. An apparent correlation in some cases between hair sprout and the decrease of Mn content in the tuber could not be explained.—G.M.R.

1214 STANTON, W. R. **Bolting, a vegetative variation in the potato.** *Heredity* 1952, **6**, No. 1, 37-52, bibl. 22. [John Innes Hort. Inst., Bayfordbury, Hertford.]

In about 80 % of the early varieties of potatoes, abnormal plants called bolters may occur. These have taller haulms, flower abundantly and continue to grow when the normal crop is mature. Bolters produce coarser, deeper-eyed tubers which are borne on longer stolons than the normal plants. The phenotype of bolters as measured by stolon length, haulm growth and tuber weight, can be changed to that of a normal by restricting the length of day in summer. Grafting shows that the scion determines the bolting behaviour rather than the stock. There is no graft transmission of a cytoplasmic determinant. Each variety has a characteristic frequency of mutation, under given conditions, and there is a range in the degree of lateness of the bolters produced. Breeding results show that the frequency of bolting in the progeny depends more on the variety than the state, bolter or normal, of the parents.—From author's summary.

1215 ONIŠČENKO, A. I. [**The resistance of potatoes to high temperatures.**] [Russian] *Doklady Akad. Nauk SSSR* 1952, **83**, No. 2, 319-20, bibl. 2. [Ukrain. Sci. Res. Inst. Veg. Prod., Kharkov]

Data on the temperature of coagulation of the protein of early, medium-early and late varieties of potatoes show a sharp differentiation between the different varieties in this characteristic. Varieties bred in the south have as a rule a lower temperature of coagulation of protein than those of northern origin. They suffer less from heat than the latter, while in dry years they give higher yields and show less degeneration than northern varieties.—R.P.J.

1216 TOMBESI, L. and TARANTOLA, Matilde. Variazioni del contenuto in glutatione ed acido ascorbico, e dell'attività ossidasica e catalasica, durante i processi di fitocicatrizzazione. [**Variations in glutathione and ascorbic acid content and in oxidase and catalase activities during the cicatrization process in plants.**] *Ann. Sper. agr.* 1952, **6**, 499-

506, bibl. 6, illus., English summary pp. 505-6. [Sta. chim.-agr. sper., Roma]

This investigation was conducted using tubers of *Solanum tuberosum*.—E.B.O.

1217 MATTINGLEY, G. H. and DOWNIE, W. A. **Potato fertilizer trials. Review of 10 years' work.** *J. Dep. Agric. Vict.* 1952, **50**, 25-34, illus.

As a result of these fertilizer trials, recommendations are made for various types and amounts of fertilizer suited to potato growing in the different areas of Victoria.—K.L.

1218 HEINZE, P. H. and others. **Variations in specific gravity of potatoes.** *Amer. Potato J.* 1952, **29**, 31-7, bibl. 8. [Bur. Plant Industry, Soils and Agric. Engng, Beltsville, Md]

Over 20,000 tubers of 6 varieties of potatoes, obtained from 10 different states of the USA, were graded individually for specific gravity. Varietal differences were noted in the specific gravity values. Katahdin showed the greatest variability and Irish Cobbler and Chippewa the least. The variability in specific gravity, as shown by the standard deviations, indicates that some lots and varieties are more adaptable than others to commercial separation into different specific gravity lots. The moisture content of the air in the storage rooms is an important factor controlling changes in specific gravity during storage. Potatoes stored at relative humidities of approximately 90 % showed slight changes in specific gravity during storage but lower humidities caused noticeable changes. Varieties differed materially in shrinkage and in their changes in specific gravity during storage.—Authors' summary.

1219 ZABALA, S. and TRAVERSI, Blanca. Obtención en serie de plantas de papa, a partir de un solo tubérculo, en invernáculo. [**Obtaining successive potato plants from a single tuber in the glass-house.**] *Inst. San. veg. Argentina* 1948, **4**, No. 13, 1-14, illus. [Received 1952]

A description is given of the technique for producing 5, 6, or even 8, plants successively from the same tuber. The process is useful in the study of virus diseases.—G.M.R.

1220 DOWNIE, W. A. **Maintenance of quality in stored table potatoes.** *J. Dep. Agric. Vict.* 1952, **50**, 61-6 and 76, illus.

Experiments were undertaken to ascertain the effects of the growth-inhibiting substances isopropyl phenyl carbamate (IPPC), and tetrachlorinated nitro benzene (NBC) on sprouting, and consequent loss in weight, of potato tubers in storage. Results showed that treating the tubers with a 2 % dust of IPPC at the rate of 3 lb. per ton kept the potato varieties tested free from sprouts for 5 months and reduced tuber-weight loss to a minimum. The treatment did not affect cooking quality or the appearance of the tubers. Treatment of tubers with NBC was successful only with the variety Snowflake.—K.L.

SWEET POTATO

1221 SHERMAN, M. **Chemical control of sweet potato insects in Hawaii.** *J. econ. Entomol.* 1951, **44**, 652-6, bibl. 5. [Hawaii Univ. Agric. Expt Sta., Honolulu]

Trials were carried out in 1950 to determine the effectiveness of Lindane, Aldrin, Chlordane, Toxaphene, DDT, Parathion, methoxychlor, cryolite and Dieldrin in controlling 2 species of sweet potato weevil, *Euscepes postfasciatus* and *Cylas formicarius elegantulus* and the sweet-potato vine borer, *Omphisia anastomosalis*. The insecticides were applied as soil treatments, pre-planting cutting dips, or combinations of these treatments. DDT at 2.0 lb. per 100 gal. water, Lindane and Parathion at 0.25 lb. per 100 gal. water and Aldrin as an emulsion at 0.25 % active ingredient applied as cutting dips in combination with 5 spray treatments [rates per ac. not given] during the growing season gave excellent control of the 2 weevil species and the vine borer. No off-flavours were noted in the sweet potatoes following the treatments.—From author's summary.

YAM

1222 MIÈGE, J. L'importance économique des ignames en Côte d'Ivoire. Répartition des cultures et principales variétés. [**The economic importance of the yam on the Ivory Coast. Crop distribution and principal varieties.**] *Rev. Bot. appl.* 1952, **32**, 144-55, illus.

The yam area on the Ivory Coast was 185,000 ha. in 1949, an increase over previous years. The regions of yam cultivation on the Ivory Coast are indicated, distribution being determined both by ecological and ethnic factors. It is grown mainly in the savannah areas adjacent to forest. A great number of varieties are grown so that yams are harvested from the end of August until January. During famine periods, tubers from wild yam species are also collected. Some of the cultivated varieties have been introduced, others have been selected from wild types. The varieties mostly grown belong to *Dioscorea alata*, *D. cayenensis* and related species. The principal varieties of the above 2 species are reviewed and their local names given. Information is given on the origin and introduction into the Ivory Coast of *D. alata*, which originated in Asia. There are about 20 cultivated varieties of this species, distinguished mainly by tuber characters. This species is high-yielding and its tubers keep well in storage, but are of inferior quality to those of *D. cayenensis*. The latter species includes many varieties, which are difficult to distinguish. The other species grown are of limited importance. They are *D. bulbifera*, *D. dumetorum*, *D. hirtiflora* and *D. esculenta*.—E.B.O.

1223 WALKER, A. Les *Dioscorea*'s du Gabon. [**The *Dioscorea* species of Gabon (French Equatorial Africa).**] *Rev. Bot. appl.* 1952, **32**, 191-3.

This brief note is concerned with the *Dioscorea* species of Gabon used for human consumption, whether cultivated or wild, and also with certain toxic species. Vernacular names are given. Amongst the food species are *D. cayenensis*, cultivated, and *D. dumetorum*, both wild and cultivated. Some of the toxic species are also eaten by the natives, during famine periods, after treatment which eliminates the toxic substance.—E.B.O.

1224 CHEVALIER, A. De quelques *Dioscorea* d'Afrique Équatoriale toxiques dont plusieurs variétés sont alimentaires. [**Some toxic *Dioscorea* species of Equatorial Africa of which several varieties are used for food.**] *Rev. Bot. appl.* 1952, **32**, 14-19, bibl. 13.

General information is given on *D. zanzibarensis*, *D. bulbifera*, *D. latifolia* and *D. anthropophagorum*.—E.B.O.

JERUSALEM ARTICHOKE

1225 TROUCHAUD, E. Le topinambour. [**Jerusalem artichoke.**] *Potasse* 1952, **26**, 35-6.

The possibilities in France of Jerusalem artichoke, *Helianthus tuberosus*, as a source of alcohol are briefly examined.—E.B.O.

1226 MARČENKO, I. I. [**Jerusalem artichoke-sunflower hybrids.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 5, 74-5. [Inst. Genet. and Sel. Akad. Sci. Ukrain. SSR]

At the All-Union Institute of Plant Industry and the Stavropol State Selection Station, the Mičurin method of hybridization of Jerusalem artichoke (*Helianthus tuberosus*) with sunflower (*H. annuus*) was employed. Analysis of the hybrids showed that fructose is contained not only in the tubers but also in the stems of the plants.—R.P.J.

FIBRE CROPS

COTTON

1227 CARVALHO, M. de. Resultados da experimentação algodoeira em Moçambique (1942/43 à 1945/46). [**Results of cotton-growing experiments in Mozambique.**] *Agronomia Lusitana* 1949, **11**, 249-375, bibl. in text, English summary pp. 272-5.

The sowing period for cotton in Mozambique begins during the second fortnight of November (in the south) and ends in the first half of January (in the north). The optimum period depends upon latitude and is later in the north than in the south. Maximum yields are obtained from early sowing, after the beginning of the true wet season: late sowing greatly reduces yield, for reasons which are enumerated. Variety trials constituted a first attempt to select from much imported material those varieties best suited to the ecological conditions of Mozambique. Selected varieties have been multiplied and distributed. Spacing trials are as yet incomplete, but meanwhile the following is recommended: 1 to 1.20 m. between rows, 0.30 to 0.50 m. between plants, according to soil and climatic conditions.—G.M.R.

1228 COTON ET FIBRES TROPICALES. Le coton au Mexique. [**Cotton in Mexico.**] *Cot. Fib. trop.* 1951, **6**, 167-74.

Information is given on cotton cultivation in Mexico, including regions of cultivation, harvest dates, varieties, insect pests and their control. In 1949, the cotton area was about 549,000 ha. and the total lint production about 208,000 metric tons, the average yield of lint per ha. varying from 261 to 570 kg. The total lint production rose to 264,500 metric tons in 1950. An Upland cotton from North America is the variety mostly grown.—E.B.O.

1229 CARDOSO DE MENESES, W. and others. Ensaio de épocas de plantio de algodão em Sete Lagôas (M.G.) Brasil. [**Experiment in planting cotton at different times, Sete Lagôas, Minas Gerais, Brazil.**] *Arch. fitotéc. Uruguay* 1951, **4**, 387-405, bibl. 9. [Serv. Nac. Pesq. Agron., Minist. Agric., Brazil]

The results of 8 years' (1940-47) uninterrupted observations on cotton at the Sete Lagôas Experiment Station are analysed. The 4 planting dates tested were 11 Oct., 21 Oct., 1 Nov. and 11 Nov., the second decade of October proving to be the best planting date for that region, although there were discrepancies in some years as well as great variations in the mean yield of the different years. Study of the meteorological causes of these variations showed that a rainless interval in the period of flower initiation lasting until about 30 days afterwards has a favourable effect on the yield of the cotton varieties Express and Piratininga, as has also the gradual rising of the maximum and medium temperature, within certain as yet undetermined limits, after the initiation of flowering.—G.M.R.

1230 JAMISON, V. C. and others. **Effect of tillage depth on soil conditions and cotton plant growth for two Alabama soils.** *Soil Sci.* 1952, **73**, 203-10, bibl. 29. [Alabama Agric. Expt Sta., Auburn]

Studies were made of the effect on the yield, root-depth and plant-height of cotton, of different seed-bed preparation-methods classified according to the depth of tillage into 3 groups: (a) more than 7 in. deep, (b) 5 to 7 in. and (c) less than 5 in. deep. The studies were carried out on fine, Greenville sandy-loam underlain with compact, red, sandy-clay and on Decatur clay, with good internal drainage. Root-depth increased as depth of tillage increased on both soils. On the Decatur soil, tillage-depth had no significant effect on plant-height, or cotton-yield. On the Greenville soil, plant-height was little affected by depth of tillage, but yields of seed-cotton rose from 1661 to 1943 lb. per ac. from the shallow- to the deep-tillage treatments, the yield difference being highly significant.—P.J.B.

1231 METGE, R. Besoins en eau d'irrigation en culture cotonnière dans le Delta central nigérien. [**Irrigation water requirements of cotton crops in the "Delta central" of the Niger.**] *Cot. Fib. trop.* 1951, **6**, 175-82.

Rainfall in the "Delta central" of the Niger is insufficient for cotton growing. If sowing takes place in July, the first rainfall of the season is sufficient for the germination and initial growth of cotton; irrigation begins in September. The American varieties Allen and N'Kourala (100 days from sowing to the opening of the first bolls) require their last irrigation in December, while the Egyptian varieties Sakel, Giza and Maarad (150 days from sowing to the opening of the first bolls) require their last irrigation in January. An account is given of the trials carried out in 1931-32 and in 1937 at the Banankoro Station, and in 1948 at the Kogoni Station, to determine the total water requirement of cotton and the best distribution of irrigation water during the plants' life cycle. Irrigation in the "Delta central" is given by the furrow system. Details are given of irrigation as practised in Egypt, the Anglo-Egyptian Sudan and the USA. It is concluded that the optimum quantities of irrigation water for cotton in the compact soils of the "Delta central" of the Niger are about 1000 cu. m. per ha., given every 12 to 15 days, during the vegetative period, and 2000 to 2500 cu. m. per ha. when preparing the land for cotton sowing before the first rains. The spacing of the irrigation furrows is discussed.—E.B.O.

1232 LOCHRIE, J. V. **Sea Island cotton varieties in the West Indies.** *Emp. Cott. Gr. Rev.* 1952, **29**, 118-21.

Trials are in progress in the West Indies to test new varieties of Sea Island cotton and to compare their lint yields and spinning quality with those of established varieties. The variety VH8, at present being bulked, has a somewhat smaller boll and a lower ginning outturn than the established variety M.S.I. Last season its average yield was almost equal to that of M.S.I., but further data are required before it can be recommended.—K.L.

1233 CHEVALIER, A. Les cotonniers de l'Oubangui, du Chari et du Tchad en 1902-1903. [**The cotton species of Ubangi, Shari and Chad (French Equatorial Africa) in 1902-1903.**] *Rev. Bot. appl.* 1951, **31**, 535-7.

Information is given on some perennial cotton species observed growing during a scientific mission to these regions in 1902-3. Of these, *Gossypium anomalum*, wild, was not utilized, while *G. punctatum* and *G. arboreum*, grown for fibre, were low yielding but disease resistant. The cultivated species were replaced in 1925 with varieties of *G. hirsutum* from the USA. During a recent journey in the Ubangi, it was observed that the old cotton species had almost disappeared, with the exception of some specimens of *G. barbadense* and *G. peruvianum*.—E.B.O.

1234 LAMBOU, M. G. and others. **Effects of high-voltage cathode-ray irradiation on cotton-seed.** *Science* 1952, **115**, 269-70, bibl. 6. [S. Reg. Res. Lab., Agric. and Industr. Chem. Bur., U.S. Dept Agric., New Orleans, La.]

The results are given of studies into the effect of different doses of high-voltage cathode rays on the germination and exterior and interior microflora of cotton seed. Irradiation significantly reduced the number of micro-organisms in and on the seed; but it also reduced germination and inhibited seedling growth. It is suggested that the effect of the rays was to inactivate one, or more, of the enzymes necessary for normal seed germination and seedling growth.—P.J.B.

1235 ANTHONY, K. R. M. and TARR, S. A. J. **The causes of deterioration of cotton seed in the Equatoria Province of the Anglo-Egyptian Sudan.** *Emp. J. exp. Agric.* 1952, **20**, 56-65, bibl. 3. [Minist. Agric., Anglo-Egyptian Sudan]

It has been shown that heavy infestation of mature cotton by stainer-bugs (*Dysdercus* spp.) can result in severe damage to the seed, the latter showing a greatly increased proportion of worthless seed and a corresponding loss in germinating capacity and decline in oil content. It is likely that rotting of the endosperm is initiated when the insect punctures the seed-coat before feeding on the seed. The extent of this field damage is closely associated with the degree of infestation of the stainer-bugs on the cotton, and this in turn is related largely to climatic and ecological factors. In Equatoria, early-picked cotton is likely to be but slightly affected, whereas that picked at the end of the season may be severely damaged. The deterioration of cotton seed, with attendant decline in germinating capacity, which occurs under certain conditions of storage, was investigated. Relative humidity was found to be an important factor and its association with greening of the endosperm is discussed. Recommendations for minimizing stainer-bug damage to cotton in the field and for avoiding seed deterioration during storage are put forward.—From authors' summary.

1236 Cabral, A. O " wilt " na Provincia do Sul do Save. [**Cotton wilt in the Province of Sul do Save, Mozambique.**] *Agronomia Lusitana* 1951, **13**, 13-18, illus., pl., 4, English summary p. 18.

Cotton wilt caused by *Verticillium dahliae* is recorded for Mozambique for the first time, affecting native cultures in the heavy alluvial soils of the Limpopo Valley. Control measures recommended are: the immediate burning of those plants attacked; the noting of resistant plants in attacked cultures and the use of their seeds in infected areas; the disinfection with sulphuric acid of any seed from the Limpopo Valley used elsewhere; crop rotation in the infected areas; the application of fertilizers, especially where K is lacking.—G.M.R.

1237 Brinkerhoff, L. A. and others. **Frequency of bacterial blight-resistant plants in twenty cotton varieties.** *Phytopathology* 1952, **42**, 98-100, bibl. 10. [Oklahoma Agric. Expt Sta., Stillwater]

Large populations, varying from 13,000 to 25,000, each of 20 varieties of cotton, including 18 American Upland (*G. hirsutum*) and two American-Egyptian (*G. barbadense*) varieties, were inoculated with *Xanthomonas malvacearum* and determinations made of the numbers of resistant and tolerant plants. Ten of the 20 varieties tested contained resistant plants, while tolerant plants were found in 3 varieties. The number of resistant plants was highest in CA 122, being 39, plus 11 tolerant plants, while in Stormproof No. 1, 25 plants were resistant and 71 tolerant. Neither of the two American-Egyptian varieties tested was either resistant or tolerant. The highest proportion of resistant and tolerant plants was found in varieties originating in Oklahoma and Texas.—P.J.B.

1238 Gaines, J. C. and others. **Toxicity of certain phosphorus compounds to cotton insects.** *J. econ. Entomol.* 1951, **44**, 750-3, bibl. 5. [Texas Agric. Expt Sta., College Station]

Trials were carried out with cotton to compare TEPP, Parathion and 3 new phosphorus compounds, TM-4049 (S-(1,2-dicarbethoxyethyl) 0,0-dimethyl dithiophosphate), TM-4018 (S-(1,2-dicarbomethoxyethyl) 0,0-diethyl dithiophosphate) and TM-4124 (0,0-diethyl 0-2-chlor-4-nitrophenyl thiophosphate) for spider mite (*Septanychus texazona*), cotton aphid (*Aphis gossypii*), boll weevil (*Anthonomus grandis*) and boll worm (*Heliothis armigera*) control. The 3 new insecticides all proved less effective than TEPP or Parathion against spider mite. In field trials, TM-4124 and TM-4049 applied at 0.3 and 0.4 lb. per ac., respectively, as spray emulsions, gave excellent aphid control. None of the new compounds was as effective against boll worm as Toxaphene. TM-4124 was effective against boll weevil. For boll weevil and boll worm control, dusts containing 3 % of TM-4124 and 15 % Toxaphene applied at a rate of 1.8 lb. of active ingredient per ac. were effective.—P.J.B.

1239 Semergeĭ, K. I. [**The influence of the products of root decomposition, from the herbage break in a rotation, on growth and development of cotton.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **78**, No. 4, 803-6, bibl. 15. [Turkman Cott./Lucerne Expt Sta., All-Union Sci. Res. Inst. Cott. Prod.]

The study was carried out in 1947 with cultures of *Gossypium hirsutum* var. 36M2. The effect of organic substances on growth of the cotton plant was investigated while varying the nutrient supplies of inorganic salts (nil, N, $N_{\frac{1}{3}}P$, $N_{\frac{2}{3}}P$, NP, NPK) and adding the following root residues which contained protein in the percentages indicated: cotton (4.3), *Dactylis glomerata* (7.1) and *Medicago sativa* (11.2). Under variants of the nutrient conditions described, data were obtained (and are tabulated) on the following features of the cotton plant; number of leaves on the main stem; growth in height; dates of budding and of flowering; and height of the first fruiting branch (an indication of earliness). There is evidence that the presence in the nutrient media of cotton root residues does not affect growth or development of the plant, but a beneficial effect on cotton development from the other root residues was observed, this effect being more pronounced with the residues of higher protein content, i.e. from *Dactylis* and *Medicago*.—M.H.

1240 Pullen, A. R. **Cotton culture in South Africa.** *Fmg S. Afr.* 1952, **27**, No. 312, 116 and 134. [Agric. Res. Sta., Barberton]

The development of cotton growing (*Gossypium hirstum* and *G. barbadense*) in South Africa is reviewed. The main problems facing the cotton grower today are: (a) the control of insect pests, especially American bollworm, stainers and the syagrus cotton beetle [scientific names not given];

(b) the production of cotton in areas of erratic and inadequate rainfall; (c) labour shortages, especially at harvest time.—K.L.

FLAX

1241 Blackman, G. E. and others. **Studies in selective weed control. IV. The control of weeds in fibre flax.** *J. agric. Sci.* 1951, **41**, No. 4, 322-37, bibl. 29, illus. [Dept Agric., Univ. Oxford]

An account is given of some 37 field experiments carried out during 1942-50 to determine the conditions under which weeds in fibre flax can be selectively controlled by herbicides. Preliminary experiments demonstrated that sulphuric acid, ammonium sulphamate and ammonium thiocyanate were too toxic to flax. The main investigations were concerned with determining the optimal conditions for the use of cupric chloride, sodium dinitro-*o*-cresylate and sodium methylchlorophenoxyacetate against weeds in flax. For all three compounds it was observed that flax was least liable to injury at a height range of 2 to 6 in. There were limitations to the amounts which could be safely employed, namely, 20 lb. of cupric chloride or 6 lb. of sodium dinitro-*o*-cresylate applied in 100 gal. of spray solution per acre. With sodium methyl-chlorophenoxyacetate the corresponding limit was 1 lb./acre, and the evidence suggests that the crop may be injured if the volume of application is reduced below 25 gal./acre. Within these limitations of concentration volume and stage of development of the crop, the suppression of annual weeds led to significant increases in the yield of straw, seed and scutched fibre. Larger gains resulted from the use of sodium methylchlorophenoxyacetate and sodium dinitro-*o*-cresylate. This superiority over cupric chloride is in part attributed to the wider range of weed species which are killed by the two sodium salts and in part due to the greater liability of crop damage if the limits on amount and time of application are not strictly observed. The results also clearly established that for fibre flax the weight of total crop, the yield of straw, the amount of seed or the plant height cannot be taken as reliable criteria for the evaluation of herbicides, for while all these may be little affected by treatment yet there may still be large reductions in the amount of recoverable fibre. A preliminary anatomical examination of the internal changes in the stems of flax has shown that when treatment with dichlorophenoxyacetic acid was delayed, a marked but localized curvature of the stem resulted and in this zone fibre formation was abnormal; thus breakages either during pulling or processing may occur at this point of weakness.—From authors' summary.

1242 New Zealand. Department of Scientific and Industrial Research. Bull. No. 104. **A statistical study of linen flax crop records.** By *G. M. Wright*. 1951, pp. 40, bibl. 19, map 1, 2s. 6d.

Field observations and factory returns for 161 crops of linen flax grown in 6 factory districts in Canterbury and Southland in 3 seasons from 1945/6 to 1947/8, have been analysed for simple relationships. Weather conditions (humidity, temperature, soil moisture) are the main factors influencing flax growth and fibre development, but in this short-term study with no detailed weather records they have not been taken into account except in very general terms. A brief account has been given of the organization of the industry in New Zealand, the areas used for growing flax, and the system of growing and buying the crop. Comparisons between the six factory districts and the three seasons have been made for many characters, and the relations between the characters have been examined and discussed. Time and rate of sowing, type of drill, previous crops, and rust infection, have been examined for their effects on seed and fibre yields and grade. A broad account of weather conditions over the period has been given, and relations shown with seasonal and locality variations in fibre production. A discussion of previous papers on flax-growing in New Zealand, and of some relevant overseas work, has been included. While flax yields and quality have improved with the increasing knowledge and experience of growers and factory staffs, it seems that with the irregular climates of New Zealand it is not possible to grow flax of quality as high as the best of western Europe.—From author's summary.

HEMP

1243 Bagge, H. and Larsen, A. Forsøg med spindehamp. Stamme-, kultur-, gødnings- og kalkforsøg 1941-48. [**Trials with hemp. Variety, cultivation, manurial and liming trials 1941-48.**] *Tidsskr. Planteavl* 1951, **54**, 628-85.

The trials reported were carried out to determine the best cultivation practices for hemp (*Cannabis sativa*) in Denmark, the cultivation of which was extended during the last war to about 2180 ha. in 1943, but has since fallen to 75 ha. in 1949. In varietal trials, the German varieties, Dr. Schurig's hemp, Sorau strains I and III, Kuhnow's and the Russian Barnauljskaja were compared. Sorau strain I gave the highest mean fibre yields in the trials, but it is recommended that cultivation in Denmark should be based on Dr. Schurig's variety. From the results of cultivation trials, the following recommendations are made: sowing rates should not be less than 100 kg. per ha., with the same row spacing as for cereals; harvest should take place when not less than half the male plants have ceased flowering, the stalks have turned yellow-green in colour and the lowest flowers on the female plants have set seed; the harvested crop should be weathered in the field for 4 weeks. Fertilizer treatments should be generous and include the equivalent of 600 kg. per ha. of calcium nitrate, 300 kg. potassic fertilizer and 200 kg. per ha. of superphosphate. Soil pH should be from 6.2 to 6.5 on sandy soils, 7 to 7.5 on clays and 7.5 to 8 on peat soils.—P.J.B.

JUTE

1244 BUZACOTT, J. H. ***Rhyparida discopunctulata* attack on jute.** *J. Aust. Inst. agric. Sci.* 1951, **17**, 214-15. [Sugar Expt Sta., Gordonvale, Qd]

This beetle, so far, has attacked only *Corchorus olitorius* in North Queensland and this is of economic importance since the pest does not attack *C. capsularis*, the species of jute which seems best adapted to North Queensland conditions.—K.L.

HIBISCUS

1245 LEFORT, M. Rôle du photopériodisme sur la culture de la roselle. [**The role of photoperiodism in the cultivation of roselle (*Hibiscus sabdariffa*).**] *Cot. Fib. trop.* 1951, **6**, 188-92, bibl. 2, illus.

In connexion with the introduction of roselle into French Equatorial Africa, the origin, description, nomenclature and climatic requirements of this crop are reviewed. Particular reference is made to the work carried out by Choussy in El Salvador which showed the importance of photoperiodism in the growth of roselle and its fibre and seed production. It is pointed out that the growth of kenaf, *H. cannabinus*, is not so influenced by light. Some varieties of roselle appear to be long-day plants and others short-day plants. Among the latter is *H. sabdariffa* var. *altissima*. The method for determining the appropriate dates for sowing roselle, either for fibre or seed production, in El Salvador is shown. If roselle is grown for fibre it should be allowed 90 to 100 days before flowering in which time it reaches its maximum vegetative development.—E.B.O.

1246 HAARER, A. E. **Soft fibre from Gold Coast roselle.** *New Commonw.* 1952, **23**, 422-3, illus.

Attention is drawn to the taller inedible variety of roselle, *Hibiscus sabdariffa* var. *altissima* which was first collected in the Gold Coast about 1911. Along with kenaf (*H. cannabinus*), roselle fibre is said to be stronger and more durable than true jute. Its agricultural requirements, cultivation, harvesting and retting are compared with kenaf.—C.L.S.

1247 NARUŠEVIČ, P. M. [**Production of seed of kenaf (*Hibiscus cannabinus*) in regions where it is grown as a fibre crop.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 5, 58-9. [N. Osetian Agric. Inst.]

Hitherto seed of kenaf for the North Caucasus, where the plant is grown as a fibre crop, has been imported annually from Uzbekistan. Trials have shown that seed can be harvested in most regions where kenaf is grown for fibre. The seed ripens satisfactorily in the foot-hill region of the North-Osetian ASSR, where it is grown without irrigation, and where it is possible, without manuring, to obtain seed yields of up to 6.9 ctr./ha.—R.P.J.

OIL CROPS

LINSEED

1248 CULBERTSON, J. O. **Registration of improved varieties of flax [linseed], V.** *Agron. J.* 1952, **44**, 153-4.

Descriptions and agronomic data are given of two linseed varieties in the USA, Sheyenne (Reg. No. 10) and Redwood (Reg. No. 11).—P.J.B.

1249 DENMARK. Statens Forsøgsvirksomhet i Plantekultur. Medd. No. 460. Foreløbig meddelelse om forsøg med sorter af oliehør 1949-50. [**Preliminary varietal trials with linseed 1949-50.**] *Tidsskr. Planteavl* 1951, **55**, 175-6.

In varietal trials at 4 locations with 6 varieties of linseed, Trifolium gave the highest seed- and oil-yields, with 20.5 and 0.781 hkg. per ha., respectively, and the lowest straw-yield 21.2 hkg. per ha. Daehnfeldt Elite 6 gave the second-highest seed- and oil-yields, with 19.8 and 0.776 hkg. per ha. respectively, followed by Aarslev 2984, Klein Nr. 18, Øtofte L.59 and Svaløf's Valuta. Svaløf's Valuta gave the lowest seed-yield, with 18.8 hkg. per ha., but the highest straw-yields, with 27.2 hkg. per ha. A brief description is given of each variety.—P.J.B.

1250 KRISHNAMURTY, T. S. **Improved varieties of oilseeds—linseed.** *Indian Fmg* 1952, **1**, 17-18.

In India, flax is grown for its seed. A table is given listing, together with their characteristics, certain promising improved varieties of linseed which have been evolved in some of the States and Institutes.—C.L.S.

1251 SACKSTON, W. E. and CARSON, R. B. **Effect of pasmo disease of flax on the yield and quality of linseed oil.** *Canad. J. Bot.* 1951, **29**, 339-50, bibl 11. [Bot. and Plant Pathol. Div., Sci. Serv., Canad. Dept Agric., Ottawa]

The varieties used were: Crystal and Viking, two rust-resistant, yellow-seeded varieties, respectively among the least susceptible and most susceptible varieties to pasmo (*Septoria linicola*); Royal and Redwing, two standard brown-seeded varieties. The trials were carried out during 1945-7 at two locations. Flax inoculated at the flowering stage had a significantly lower mean oil content and a lower iodine number for the oil than that inoculated at the seedling, post-flowering and ripening stages. The effect of pasmo infections on the oil content of the seed and the iodine number of the oil was similar to that caused by hot, dry climatic conditions. Inoculations made when the seed was ripening had little effect on the oil content of the seed or on the iodine number of the oil. [See also *Fld Crop Abstr.* 3: 1428.]—P.J.B.

1252 KERR, H. B. **The use of excised shoots in linseed investigations.** *Proc. Linn. Soc. N.S.W.* 1951, **76**, 183-6, bibl. 6, illus. [Fac. Agric., Univ. Sydney]

Investigations dealing with physiologic specialization in *Melampsora lini* and the genetics of resistance in crosses between varieties of *Linum usitatissimum* have been in progress since 1940. The excised shoot technique, which has recently been developed, involves the excision of shoots above the cotyledons, and their susbsequent growth in tap water or a nutrient solution. The advantages of the technique are: elimination of the risk from rust contamination of the shoot, ease in handling the equipment, and the rapid means for increasing the number of plants.—K.L.

SAFFLOWER

1253 DUFRESSE, M. and BRYSSINE, P. Le carthame. [**Safflower.**] *Terre maroc.* 1951, **25**, 393-8, bibl. 13; 1952, **26**, 87-8.

Information is given on safflower (*Carthamus tinctorius*), an oil-producing crop; its history, soil requirements, position in the crop rotation, cultivation, manuring, method, date and rate of sowing, harvesting, yield and the oil content of its seed. The yield varies generally from 10 to 15 q. of seed per ha. but up to 25 q. are obtained under favourable conditions. The oil content of the seed is about 23% by weight, but the percentage of oil extracted in industry is lower. Selection of this crop started at the Centre de Recherches Agronomiques, Rabat, about 10 years ago and is mainly directed at obtaining thornless varieties having seeds with a high oil content and a thin main stem with many branches arising from the base to facilitate mechanical harvesting.—E.B.O.

1254 THOMAS, C. A. **Transmission of safflower rust on treated seed.** *Phytopathology* 1952, **42**, 108-9. [Tobacco, Med. and Special Crops Div., U.S. Dept Agric., Plant Industry Sta., Beltsville, Md]

The results are given of trials with a number of fungicides used as seed treatments to control *Puccinia carthami* on safflower (*Carthamus tinctorius*) seed. All treatments appreciably reduced seedling infection and completely eliminated hypocotyl infection. Ceresan M dust at rates per bu. of 0.5 to 9 oz. (the maximum the seed would hold) in no case completely controlled seedling infection, though the 9 oz. treatment resulted in an infection of only 0.019 % of seedlings, compared with an 18.2 % infection in seedlings from untreated control. In limited trials, Parzate and Phygon XL gave complete control of seedling infection, without causing seedling injury when applied in excess amounts to the seed. Further trials with these two fungicides will be carried out. —P.J.B.

SUNFLOWER

1255 ANDRÉ, E. Le tournesol ou grand soleil (*Helianthus annuus* L.), plante oléagineuse. [**Sunflower (*Helianthus annuus* L.), an oil plant.**] *Oléagineux* 1952, **7**, 127-33 and 201-5, illus.

This review of the sunflower gives its description, history, cultural methods, requirements and yield. Mention is made of 2 sunflower varieties bred in France, namely, variety 39 of the École de Montpellier and the giant Saint-Réverend hybrid selected at Saint-Genis-de-Saintonge. A brief description is given of sunflower cultivation in the principal sunflower-growing countries of the world including the USSR (the most important), Rumania, Bulgaria, Hungary, Turkey, Spain, South America (large areas are grown in Argentina, Chile and Uruguay), Canada, South Africa and Australia.—E.B.O.

1256 MUJICA R., F. Medidas adicionales de control de la esclerotiniosis del girasol. [**Additional means of controlling the sclerotinia disease of *Helianthus annuus*.**] *Prim. Asamb. Latinoamer. Fitoparasit., Mexico* 1951, 158-62, bibl. 3. [Chile]

The most serious disease of sunflower in Chile is that caused by *Sclerotinia sclerotiorum*, and its increasing distribution is due to the use of contaminated seed. Control measures recommended are: use of seed certified by the Ministry of Agriculture; disinfection of any doubtful seed, preferably with Ceresan or Meracet; a 4-year rotation, with cereals and herbage grasses as the other crops; cleaning of infected land by burning the remains of the sunflower crop, and the cleaning of all implements used. Wide sowing, as wide as economically possible, weed eradication and the restriction of irrigation to a minimum are also valuable preventive measures.—G.M.R.

RAPE

1257 Valle, O. Über die anbaumöglichkeiten von winterrübsen in Finnland. [**The possibilities of cultivating winter turnip-rape in Finland.**] *Forskn. fors. landbr.* 1951, **2**, 38-51, bibl. 9.

A review is given of progress in the cultivation of winter turnip-rape [*Brassica campestris* var. *oleifera* subvar. *biennis*] in Finland, mainly based on work done at Dickursby.—P.J.B.

1258 Bunting, E. S. and others. **The cultivation of annual rapes as oil seed crops.** *Agriculture, Lond.* 1952, **58**, 509-13, bibl. 7. [Agric. Res. Coun. Exptl Agron. Unit, Dept Agric., Oxford]

A brief review is given of the production of rape seed in Britain and on the Continent. During 1951, about 5000 ac. of rape were grown for oil seed in Britain and it is probable that this acreage will increase. In Western Europe 2 species of *Brassica* are cultivated for oil seed, both of which include annual (spring-sown) and biennial (autumn-sown) varieties. The botanical nomenclature of *Brassica* species is still confused, but the following terminology is proposed as a standard nomenclature in Britain :

Brassica napus var. *oleifera* subvar. *biennis*. Winter rape.

Brassica napus var. *oleifera* subvar. *annua*. Summer rape.

Brassica campestris var. *oleifera* subvar. *biennis*. Winter turnip-rape.

Brassica campestris var. *oleifera* subvar. *annua*. Summer turnip-rape.

Campestris is preferred to *rapa*, a term frequently used in the literature on oil-seed crops. In Britain most attention has been paid to the spring-sown rapes, owing to the difficulty of fitting the winter rapes, normally sown in late July and early August, into the existing crop rotation systems. In trials, a comparison of Regina, Black Argentine and Liho summer rapes has shown very little differences between seed yields, mean yields for each variety during 1948 and 50 being 9.5 cwt. per ac. In similar trials with summer turnip-rape, the average yield for Controllée and Sweet German were 7.2 and 7.7 cwt. per ac. An outline is given of cultivation and harvesting practices suitable for Britain.—P.J.B.

1259 Mueller, W. Der Einfluss von Licht, Temperatur und Substrat auf die Keimung von Samen einiger *Brassica*-Arten. [**Influence of light, temperature and substrate on germination of seeds of some species of *Brassica*.**] *Angew. Bot.* 1952, **26**, 100-10, bibl. 9, illus.

For the species examined (*Brassica campestris oleifera*, *B. napus* and *B. nigra*), the constant temperature of 22°C. was found to be the best temperature for germination. This is in agreement with the German and United States rules for seed testing which prescribe a temperature of 20°C. as the most favourable temperature for the germination of *Brassica* species. In the open air (not constant temperature) seed of all three species germinated better in darkness than in light. Both in darkness and in light, filter paper proved to be superior to soil as a seed bed.—D.B.

1260 Giering, E. Zur Untersuchung der Sommer- und Winterformen von Raps im Laboratoriumversuch. [**Distinguishing summer and winter forms of rape in laboratory trials.**] *Z. Acker- und Pflanzenb.* 1950, **94**, 387-96, bibl. 11, illus. [Univ. Greifswald, Germany]

It is especially difficult to distinguish between the seed of winter and summer forms of rape. Attempts to do so by means of the development of the growing point of seedlings after continuous illumination gave negative results. Under the conditions of the experiment (200-watt lamp at a distance of 60 cm., temperature 28°C.), no difference in the shape and size of the growing point could be observed, even after 14 days' illumination. The primordial leaves exhibited, however, independent of illumination, differences which enabled a clear distinction to be made, all the summer forms tested having hairs at the edge of the leaves, the winter forms being entirely hairless, or slightly haired in isolated cases only. The character is one which may be used with a very fair degree of reliability, results being available within 4 to 6 days.—G.M.R.

1261 Sweden. Statens Växtskyddsanstalt. Medd. Nr. 59. Orienterande frekvensräkningar av bin i raps 1949. [**Preliminary studies of bee frequencies in rape, 1949.**] By *Brita Persson.* 1951, pp. 32, bibl. 12, English summary pp. 28-32.

The studies were made to provide a basis for timing insecticidal treatment during the flowering of rape, so that the minimum injury is caused to bees working in the crop. Counts of honey bee populations were made in winter rape [*Brassica napus* var. *oleifera* subvar. *biennis*] and summer rape [*B. napus* var. *oleifera* subvar. *annua*] in relation to time of day and weather conditions. In both crops in the Åkarp district in mid-May, bees began working in rape about 3 hr. after sunrise and continued until 2-2.5 hr. before sunset. The average number of bees per m.^{2} in one spring-rape crop rose rapidly to 4.5 by 0800 hr., to a maximum of 5 per m.^{2} by 1500 hr., and thereafter decreased rapidly to 1 per m.^{2} by 1800 hr. A similar distribution of bees was noted in winter-rape crops. Low temperatures combined with high R.H. inhibited bee activity.

During the morning, bee activity increased as temperatures rose, though the highest temperatures did not always coincide with maximum bee activity possibly owing to the evaporation of water from nectar and a consequent reduction in nectar volume. Strong winds delayed the start of bee activities during the morning, but by 0900 hr., such effects were largely eliminated by the rise in air temperatures. Bee frequencies were very low, or nil, during cloudy weather and, during rain, bees were absent from crops.—P.J.B.

POPPY

1262 Wageningen, Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over Rassenkeuze. No. 118. Blauwmaanzaad, 1952. [**Poppy seed, 1952.**] 1951, pp. 2.

Poppy seed production is mainly confined to the south-western clay regions in the Netherlands, particularly in Zeeland. Four varieties are included in the list of recommended varieties, namely Noordster, Emmabloem, Mansholt's and Nobel: these occupied 59, 27, 8 and 6 %, respectively, of the total acreage in 1951. Noordster has given considerably higher yields than the other 3 varieties in interprovincial trials from 1946-51, though it is relatively more sensitive to climatic conditions and its yield varies somewhat from year to year. Emmabloem has outyielded Mansholt's and Nobel on the south-western sea-clays and has good seed quality. Mansholt's has given yields equal to Emmabloem on the central sea-clays, but has given low yields on south-western sea-clays. Nobel has given somewhat lower yields than Emmabloem, but has seed of excellent quality.—P.J.B.

GENERAL

1263 Boev, N. D. and Frolov, P. V. [**Results of State varietal trials of oil crops.**] [Russian] *Selek. Semenovod.* 1952, **19,** No. 1, 34-41. [State Comm. Var. Trials Grain, Oil Crops and Herb. Plants]

Information is given regarding suitable varieties of oil crops for various regions of the Soviet Union. The crops discussed include *Helianthus annuus*, and species [not named] of *Linum*, *Sinapis*, *Arachis*, *Sesamum*, *Camelina*, *Papaver*, *Carthamus*, *Ricinus*, *Perilla*, and *Brassica oleifera*.—M.H.

1264 Boev, N. D. and Frolov, P. V. [**Concerning the extension of the cultivation of linseed, mustard and sunflower.**] [Russian] *Selek. Semenovod.* 1952, **19**, No. 2, 45-9. [State Comm. Var. Trials Grain, Oil crops and Herb. Plants]

The principal regions of cultivation of sunflower, linseed, castor oil plant, mustard etc. are the North Caucasus, the Lower Volga provinces and the southern provinces of the Ukraine. The cultivation of sunflower and linseed could be extended into individual northern and western provinces of the Ukrainian SSR, and also into a number of provinces of the central black earth zone and into the South-East, where yields of sunflower in varietal trials amount to 20 to 25 ctr./ha. Linseed also gives high yields. On irrigated soils the yield of sunflower reaches 32 ctr./ha., of linseed 26 ctr./ha. and of mustard 16 ctr./ha. Irrigation also increases the accumulation of fat in the seeds and the yield of oil. Many regions of the Urals, Western and Eastern Siberia and the northern provinces of Kazakhstan are of particular interest for the cultivation of a number of oil crops.—R.P.J.

LAND USE, SURVEYS AND MANAGEMENT

1265 Malmström, C. Om den svenska markens utnyttjande för bete, åker, äng och skog genom tiderna och orsakerna till rörligheten i utnyttjandet. [**Land use in Sweden. Its changes through the ages and an attempt at an analysis of the underlying causes.**] *K. LantbrAkad. Tidskr., Stockh.* 1951, **90**, 292-314, bibl. 40.

A brief historical survey of land use is given, which provides a background to the discussions now going on in Sweden on the proper balance between agriculture and forestry. Part I surveys the changes in land use for pasture, hay, arable and orestry. Correlations are sought between these changes and such factors as density of population, new agricultural techniques and changes in economic and social patterns. Part II attempts an ecological analysis of land use, with special emphasis on temporary variations in the level of soil fertility.—From author's summary.

1266 Utah Agricultural Experiment Station. Special Rep. 4. **Utah's land resources.** By *L. A. Reuss* and *G. T. Blanch.* 1951, pp. 66.

Basic information is given on the physical factors, population, ownership of land, present use and trends in ownership, land use and crop and forage yields in Utah.—P.J.B.

1267 Engledow, F. **The agricultural development of Southern Rhodesia.** *Rep. Minist. Agric. and Lands, S. Rhod.* 1950, pp. 132, bibl. 12, tbl. 7, append. 6. [Received 1952]

This very comprehensive report embraces all the important aspects of Southern Rhodesia's agriculture. The important role it is called upon to play in the national economy and the natural and human resources available for agricultural production are gone into at length and lead to conclusions and recommendations for agricultural policy and development which are summarized in chapter 6. Only a limited amount of land in S. Rhodesia is well suited by soil and rainfall to regular arable cultivation and it is essential to farm this land highly and to bring all of it into use. Both large and small irrigation schemes should be considered ; the storage dam offers possibilities on a farm scale. Farming systems (to displace single-commodity production or rotations which fail to maintain soil fertility) related to soil/rainfall conditions are categorized and recommendations are made on cotton, groundnut, maize and sorghum growing. The expansion of the first two crops might well be warranted, and, as it may be doubted whether there is enough available land with a reliable rainfall which can be cropped with maize to provide self-sufficiency over a number of years, it is inferred that further cereal production will have to come from an expansion and improvement in the growing of sorghum (kaffir corn) or certain small millets. This detailed and constructive analysis of the agricultural problems of both Europeans and natives should lead to a definition of a long-term national agricultural policy formulated, it is suggested, by the farmers themselves through their own organizations. "In S. Rhodesia, need for more food production imposes a heavy urgent task, while delay in dealing with long-term agricultural policy would be a grave error."—C.L.S.

1268 NEVELING, C. H. **300 years of agriculture [in S. Africa].** *Fmg S. Afr.* 1952, **27**, No. 312, 79-80.

1269 FARMING IN SOUTH AFRICA. **A special Van Riebeeck-Festival number on three centuries of agricultural development [in S. Africa].** *Fmg S. Afr.* 1952, **27**, No. 312, 74-230.

This is a review of information abstracted elsewhere in this journal. [See Abs. 1117, 1142, 1240, 1268, 1281, 1282, 1349 and 1359.]—K.L.

1270 THOMAS, S. O. **The development of rural areas. A policy for small and hill farms [in Wales].** *Rur. Wales Yrb. Welsh Agric. Co-op 1950-51.* 1952, 35-8. [Welsh Agric. Organ Soc.]

1271 VAN DER PAAUW, F. **Periodical fluctuation of soil fertility and crop yields.** *Trans. Int. Soil Sci. Congress* 1950, **2**, pp. 3, bibl. 3. [Agric. Expt Sta. and Soil Res. Inst., T.N.O., Groningen, Netherlands]

Pronounced periodicity in crop yields has been noted in yield trials in the Netherlands. This periodicity has been similar in its course for wheat yields on clay soil and for rye yields on sandy soil. It is thus unlikely that the type of soil, or the crop affect this periodicity. There is a marked negative correlation between the course of crop yields and soil pH. There are indications that climatic fluctuations are responsible for this periodicity of yields, but little can be said with certainty as yet. The results of mathematical analyses of the yield periodicity of sugar-beet, oats and rye point to a yield phase with a period of 4 to 5 years.—P.J.B.

1272 MACLUSKIE, H. **The reclamation of mangrove swamp areas for rice cultivation with reference to the Scarcies Delta in Sierra Leone.** *World Crops* 1952, **4**, 129-32, bibl. 6, illus.

The mangrove forest in the Scarcies Delta of Sierra Leone consists, in the main, of *Rhizophera recemosa* or fresh-water mangrove, and *Avicennia nitida* which thrives in saline places. The difference in habit between these two types influences the methods necessary for the exploitation of mangrove lands for rice-growing. Soil erosion in cleared mangrove land is best controlled by bunding, but with *Rhizophera* mangrove land the appearance of iron sulphate on the soil surface creates a problem. With *Avicennia* the areas must first be empoldered and salt removed. The polders are built to exclude spring tides and excess rainwater is expelled at low tide taking with it the salt in solution.—C.L.S.

FARMING SYSTEMS AND PRACTICES

1273 REA, J. G. G. **Balanced farming.** *Agric. Progr.* 1951, **26**, 36-8. [Berrington, Ancroft, Berwick-on-Tweed]

In this general article the author discusses the place of cash crops, fodder root crops and the ley in a balanced rotation. The controlling factor in the attainment of such a balanced farming system is the availability of labour.—K.L.

1274 WHITE, W. J. **Agriculture in the Beaudesert District [of Queensland].** *Qd agric. J* 1952, **74**, 1-11.

The subject is dealt with under : climate, soils and vegetation, water facilities, native and introduced pastures, agricultural and horticultural crops dairying and pig-raising. The main summer crops are lucerne, maize, sweet sorghums and Sudan grass. Oats, wheat, barley and field peas are used for grazing in the winter. [From *Herb. Abstr.*]—K.L.

1275 IOWA Agricultural Experiment Station. Res. Bull. 383. **The economics of crop rotations and land use. A fundamental study in efficiency with emphasis on economic balance of forage and grain crops.** By *E. O. Heady* and *H. R. Jensen*. 1951, pp. 420-59.
The results are given of a detailed study of the economic inter-relationships of crops in rotations and regional specialization in cropping systems in Iowa, with particular reference to the complementary and competitive relationships between forage and grain crops. [From *Herb. Abstr.*]—P.J.B.

1276 HIGHSMITH, R. M. and MILLER, E. E. **Open field farming in the Yakima Valley, Washington.** *Econ. Geogr.* 1952, 74-87.
A description and an analysis are given of irrigated cropping in the Yakima Valley, a 500,000 acre area under fruit, horticultural and field crops.—P.J.B.

1277 CALIFORNIA University College of Agriculture. Extn Serv. Circ. 173. **Farming in California.** By *A. Shultis*. 1951, pp. 51.
This circular is primarily intended to provide guidance for prospective buyers of farms in California. It contains a considerable amount of general information on Californian agriculture. [From *Herb. Abstr.*]—P.J.B.

1278 TEXAS Agricultural Experiment Station. **Irrigated agriculture in Texas.** By *W. F. Hughes* and *J. R. Motheral*. 1950, pp. 37. [Received 1952] [College Station]
A summarized review is given of the extent and location of irrigation farming in Texas, present trends in such farming, the acreage, yield and value of irrigated crops and the acreage and number of farms served by different types of organizations providing water, including that obtained from surface and underground supplies. The data are largely derived from a survey carried out during 1949.—P.J.B.

1279 UTAH Agricultural Experiment Station. Bull. 346. **Irrigation waters of Utah.** By *J. P. Thorne* and *D. W. Thorne*. 1951, pp. 64, bibl. 12. [Logan]
The results are given of analyses of irrigation streams in Utah and determinations of water quality ratings. Recommendations are given for irrigation and soil management practices where irrigation waters are of low quality, together with a table showing the relative salt tolerance of a number of field crops.—P.J.B.

280 BLANEY, H. F. **Irrigation requirements of crops.** *Agric. Engng, St. Joseph, Mich.* 1951, **32**, 665-8, bibl. 14. [Soil Conserv. Serv., U.S. Dept Agric., Los Angeles, Calif.]
Details are given of methods for calculating, (a) the consumptive use, i.e. the total amount of water transpired and evaporated from a given area of crop, and, (b) the irrigation requirement, i.e. the amount of water, excluding rainfall, required for crop production and including the amount transpired and evaporated from the crop, together with that lost by soil percolation and other unavoidable losses. The data given refer to conditions in western USA and to a range of field crops, including beans, maize, cotton, flax, small grains, grain sorghum, potatoes, rice and sugar-beet.—P.J.B.

1281 MERWE, C. R. van der. **Three centuries of irrigation farming** [**in S. Africa.**]. *Fmg S. Afr.* 1952, **27**, No. 312, 216-18, bibl. 4. [Div. Chem. Serv., Pretoria]

1282 VORSTER, J. A. and GROBLER, B. J. **Mechanisation in agriculture** [**in S. Africa**]. *Fmg S. Afr.* 1952, **27**, No. 312, 123-5, illus. [Agric. Res. Inst., Pretoria]
This is mainly a historical note.—A.G.G.H.

1283 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. Adv. Leafl. 257. **Green manuring.** 1952, pp. 4.
An account is given of the various aspects of green manuring in Britain. Examples are given of the green manure crops which can be grown in rotations as: (1) summer-sown catch crops for ploughing-under in autumn e.g. mustard, rye, lupins and Italian ryegrass; (2) undersown crops in cereal main crops, e.g. red clover, trefoil; (3) crops taken after a bare fallow, e.g. mustard and rape; (4) main crops on very poor sandy soil, e.g. lupins. —K.L.

1284 PANTANELLI, E. Esperienze e considerazioni sul sovescio in clima caldo-arido. [**Trials and observations on green-manuring in a warm-dry climate.**] *Ann. Sper. agr.* 1952, **6**, 127-63, bibl. 46, illus., English summary pp. 160-1. [Late of Sta. agr. Sper. Bari, Italy]
In the warm-dry climate of southern Italy, green manures cannot be ploughed under later than May as the summer heat suppresses all herbaceous vegetation. An account is given of pot and field trials conducted during 1928-39 to ascertain whether in a dry-warm climate green manures ploughed under in spring are beneficial to the succeeding autumn crop. Results of these trials showed that little horse-bean (*Vicia faba* var. *minor*), vetch and *Lathyrus ochrus*, grown in autumn/winter, and several years old leys of lucerne and *Hedysarum coronarium*, all ploughed under in spring, had a considerable fertilizing effect on the succeeding autumn cereal crop. This fertilizing effect, al-

though greatly reduced, was felt also by the summer maize crop which followed the winter cereal. Although summer drought appeared to delay considerably the decomposition of green manures, there was an advantage in ploughing under as late as possible in spring and in employing crops which decompose slowly. The effect on the soil of several green manures was studied. [From *Herb. Abstr.*]—E.B.O.

1285 Gerasimov, I. P. [**Transformation of the nature of steppes and deserts.**] [Russian] *Priroda, Moskva* 1952, **41**, No. 1, 25-39, bibl. in text.

This is a discussion of the long-term measures (hydro-electric installations for irrigation systems, construction of shelter belts, and the introduction of a ley system of farming) which have been designed to improve crop production in various parts of the Soviet Union, e.g. in the steppes of the Crimea, southern Ukraine, the Lower Volga Provinces, and in parts of Soviet Central Asia. [See also Abs. 689.] [From *Herb. Abstr.*]—M.H.

1286 Glazun, A. [**A study of specialization on collective farms in the neighbourhood of Voronež.**] [Russian] *Soc. seljs. hoz.* 1952, **23**, No. 4, 14-25.

This study of agricultural economics was made in an attempt to throw light on the relative productiveness of the units comprising merged collective farms in the region concerned (approx. 52°N. lat., 40°E. long). Information on the following is tabulated: (1) area of sown crops (expressed in percentage of the total area of 6 named districts) which include grain crops, sunflower, sugar-beet and potatoes: (2) percentage area utilized as arable, hay fields, irrigated plots, common pasture, etc.; and (3) gross yields and marketable produce (expressed in roubles accruing per hectare of agricultural land) obtained from the crops listed under (1). The data are discussed in relation to future organization of the agricultural industry.—M.H.

1287 Desai, S. V. and Abhiswar, S. N. **Nitrogen economy in crop rotation without manures.** *Sci. & Cult.* 1952, **17**, No. 8, 323-5, bibl. 13.

At Pusa, wheat, wheat and sunnhemp, and sunnhemp were grown on 3 drain-gauges for 30 years, one drain-gauge being left fallow. The drainage waters were measured and their content of nitrites, nitrates and ammonia estimated by standard methods. Crop weights and composition were also determined. From an analysis of the data it is concluded that sunnhemp does not use any nitrogen from, or add any to, the soil. Where sunnhemp is grown with wheat it is the legume that may be benefited by association with the cereal, as far as yield is concerned. Yields of wheat after sunnhemp were very much less than yields of wheat grown alone.—C.L.S.

SOIL AND WATER CONSERVATION

1288 Staple, W. J. and Lehane, J. J. **The conservation of soil moisture in southern Saskatchewan.** *Sci. Agric.* 1952, **32**, 36-47, bibl. 15. [Soil Res. Lab., Swift Current, Sask.]

The results of determinations of moisture conservation on summer-fallowed fields over a 7-year period are presented. During winter, stubbles and crop residues were of some value in holding snow, which provided two-thirds of the moisture present in the soils at the time of sowing. Weed growth during the time of summer fallowing caused large moisture losses and it is recommended that cultivation of summer fallows be started early to prevent weed growth and that crop residues and long stubbles be left to hold winter snow. About 5 to 6 in. of effective rainfall were required to produce a minimum yield of 1 to 2 bu. per ac. of wheat. 10.5 in. of rainfall produced 14 bu. per ac. and each additional inch of rainfall increased yields by 6 bu. per ac., under the conditions prevailing in the Swift Current area.—P.J.B.

1289 Wisconsin University Agricultural Experiment Station. Bull. 494. **Erosion controlled by terraces.** By *H. B. Atkinson* and *O. E. Hays.* 1951, pp. 16.

The results are given of experimental work in Wisconsin on the use of terracing to control soil erosion, which indicated that under Wisconsin conditions, on slopes varying from 10 to 17 %, terracing was required where the length of land across the slope exceeded 250 ft.; strip cropping did not give adequate erosion control where the slope length exceeded 250 ft. Soil losses were 6 times greater from unterraced, contoured fields than from terraced fields, both under 3-course rotations. Terracing also gave the best erosion control during storms of critical intensity, 11 of which, during a 14-year period, caused 60 % of the total soil losses from unterraced fields. An effective cross-sectional area of 8 sq. ft. provided sufficient channel capacity to hold back water on graded field terraces, with a run-off grade of 0.2 to 0.5 % along the bottom of the terrace channel. Terracing permits of a more flexible system of farm management than strip cropping and also allows the entire field to be put under one crop, though the rotation must be so adjusted that a high organic matter content is maintained in the soil. Crop yields on terraced fields have averaged 7 % more than those on strip-cropped fields.—P.J.B.

1290 California University College of Agriculture. Extn Serv. Circ. 174. **Winter cover crops.** By *B. A. Madson.* 1951, pp. 24.
Practical recommendations are given for using a wide range of cover crops for soil improvement in California, together with a table comparing the characteristics of different cover crops adapted to Californian conditions. [From *Herb. Abstr.*]—P.J.B.

WEEDS AND WEED CONTROL

1291 Pauzé, F. La propagation des mauvaises herbes. [**Weed propagation.**] *Rev. d'Oka* 1951, **25**, 125-31 and 173-88. [Inst. d'Oka, Québec]
L'aspect écologique du problème des mauvaises herbes by A. Hamel and P. Dansereau (see *Fld Crop Abstr.* 2 : 86 and 4 : 512) inspired this article, which is concerned with the following: (a) definition of weeds; (b) weed phytosociology; (c) weed propagation (which is related to weed noxiousness), examples are given; (d) weed seeds and their germination, including an account of a germination study with the seeds of 40 weed species; (e) dissemination of weed seeds; and (f) vegetative reproduction of weeds. Information is also given on the losses caused by weeds to Canadian crops. [From *Herb. Abstr.*]—E.B.O.

1293 Derico, T. R. **Experimental control of cogon (*Imperata cylindrica* [Linn.] Beauv.), water hyacinth (*Eichhornia azurea* Kunth.), *Lantana camara* Linn., and other noxious weeds with 2,4-D and other herbicides.** *Philipp. Agriculturist* 1951, **34**, 189-201, bibl. 13. [Agric. Coll., Philipp. Univ., Los Banos, Laguna]
In trials, single applications of 14, 16 and 18 % aqueous solutions of Ammate made at a rate of 4 l. per 7 m.^{2} gave, within 3 weeks, complete control of cogon grass growing on porous soil. Cogon grass growing on heavy soil required a second treatment when the regrowth sprouts had two or three leaves. Treatment with 4, 6, 8 and 10 % aqueous solutions of sodium TCA and also 1.5, 2 and 3 % aqueous solutions of Esteron 44 (2,4-D ester preparation) [rates of application not given] killed the above-ground parts of the plants, but did not kill the rhizomes. For treating water hyacinth, sprays of 0.5, 1 and 1.5 % aqueous solutions of Fernoxone, Esteron 44, 2,4-Dow Weed Killer, Du Pont 2,4-D 74 % amine and Du Pont 2,4-D were the most effective, giving a complete kill within 4 weeks. Spray treatments with 1 and 1.5 % aqueous solutions of Esteron 44 and Fernoxone gave complete control of *Lantana camara*, *Maghania strobilifera*, *Blumea balsamifera* and *Urena lobata*.—P.J.B.

1293 Revue de Botanique Appliquée. La lutte contre l'*Imperata*. [**Control of *Imperata*.**] *Rev. Bot. appl.* 1952, **32**, 103-4.
On an area of 1000 ha. under cassava which was invaded by *Imperata* grass in Madagascar, complete control of this weed was obtained by tractor cultivating the soil to a medium depth in the dry season and again in the wet season and by planting a strong-growing cassava variety. Good control of *I. cylindrica* is said to be obtained on bush soil in Indo-China by sowing *Mimosa invisa* amongst the weed at the rate of 20 to 40 kg. of seed per ha.—E.B.O.

1294 Loustalot, A. J. and others. **Nutgrass control with methyl bromide.** *Rep. Fed. Expt Sta. Puerto Rico 1951.* 1951, pp. 27.
Applications of 0.5 lb. of methyl bromide per 100 sq. ft. eradicated nutgrass (*Cyperus rotundus*) tubers to a depth of 9 in. in ploughed soil, where an airtight cover was maintained over the treated area for 48 hr. Data are given on the distribution of nutgrass tubers in different soil layers. Only 3–5% of the total occurred at a depth of 6 to 9 in. [See also *Fld Crop Abstr.* 4 : 1136.]—P.J.B.

1295 Gupte, M. V. **Kill them with weedicides.** *Farmer, Bombay* 1952, **3**, 55-6.
The weeds *Acanthospermum hispidum* and *Xanthium strumarium* in pastures can be controlled by spraying with Fernoxone at a concentration of 0.2 % at the rate of 100 gallons per acre.—C.L.S.

1296 Pryor, M. R. and Dana, R. H. **Gorse control.** *Bull. Calif. Dept Agric.* 1952, **41**, 43-5. [Bur. Rodent and Weed Control and Seed Inspect., State Dept Agric., Sacramento, Calif.]
A note is given on the spread of gorse (*Ulex europaeus*) in California. Control measures recommended include burning, followed by removal of roots and the sowing of the cleared area to crops. In trials with herbicides, the most effective control was obtained by burning the gorse, followed by spraying the actively-growing seedlings, which develop after burning, with a 4000 ppm solution of 2,4,5-T ester, prepared by adding 3.34 lb. of the ester to 100 gal. water + 5 gal. of aromatic oil. In

most cases, treatment must be continued over a number of years to ensure eradication of the gorse. —P.J.B.

1297 Journal of the Department of Agriculture of South Australia. **Recommendations for skeleton weed control.** *J. Dep. Agric. S. Aust.* 1952, **55**, 357.

The following recommendations for the control of skeleton weed (*Chondrilla juncea*) in crops and pastures of New South Wales and South Australia are based on the results of 2 years' trials and observations (although the spraying of wheat and oats for hay and grain with hormone weedkillers has successfully suppressed skeleton weed, sufficient information is not yet available regarding the long-term effects of spraying, on the persistence of clovers and medics): (1) the spraying of skeleton weed at the rate of 0.75 lb. amine salt of 2,4-D per ac. was most profitable when the crop was heavy and soil fertility was high. Where soil fertility is low the rate of application should be increased to 1 lb. of 2,4-D per acre. (2) Application of the herbicide should be made when skeleton weed is actively growing, and when the crop (in which the weed is growing) has developed its secondary root system, but before the heads can be distinctly felt in the cereal stems. The herbicide should not be applied when rain is imminent. (3) Stock should be excluded from the sprayed area until the weed dies. (4) Spraying with the herbicide should be used only in conjunction with sound farming methods.—K.L.

1298 Orchard, H. E. **Slender perennial pepper cress.** (***Lepidium latifolium* L.**) [**in S. Australia**]. *J. Dep. Agric. S. Aust.* 1952, **55**, 295-6.

Eradication of *L. latifolium* can be effected by means of any of the spray formulations of MCPA or 2,4-D applied at the rate of 0.2% in aqueous solution. Applications should be made when the weed is in an active state of growth (i.e. during November and December). [From *Herb. Abstr.*]—K.L.

1299 Orchard, H. E. **Yellow burr-weed** (***Amsinckia hispida* Johnston**). *J. Dep. Agric. S. Aust.* 1952, **55**, 358-9.

This plant is essentially a weed of arable areas where it causes serious reductions in yields of cereal grain. Eradication measures include cultivating badly-infested land in the early winter to destroy the weed seedlings, destroying the plants (by hand-pulling if necessary) before they begin to flower, and spraying the weed in a standing cereal crop with 2,4-D [rates not given]. *A. hispida* has been suppressed successfully in the Victorian Wimmera by sowing wheat stubble with Wimmera ryegrass (*Lolium rigidum* var. *subulatum*) and leaving the area to pasture for several seasons.—K.L.

1300 Fleischman, Bessie. **Preliminary studies of the germination responses of damaged seed of some *Chenopodium* species.** *Proc. Ass. Off. Seed Anal. N. Amer. 1951.* 1951, 119-22. [Oregon State Coll., Corvallis]

From studies of the germination of *Chenopodium album* seed with different degrees of damage to seed-coat, radicle and hypocotyl, it was concluded that: seed with damaged embryos was not capable of germinating; seed with half, or no seed-coat present produced only a small number of normal sprouts; seed with 75% and more of the seed-coat present had a germination percentage approaching that of undamaged seed.—P.J.B.

1301 Thorup, S. Laboratorieforsøg med hormonpræparater til ukrudtsbekæmpelse. [**Laboratory experiments with hormone preparations for weed control.**] *Tidsskr. Planteavl* 1951, **54**, 553-627, bibl. 26, English summary pp. 623-6.

A report is given of the main results of laboratory trials with herbicides carried out during 1946-8 by the Danish Weed Research Station. The trials included: (a) biological determinations of the content of active substances in hormone preparations, (b) the cleaning of instruments and sprayers contaminated with 4K-2M and 2,4-D, (c) determinations of the germination of seed from hormone-treated plants, (d) the effect of hormone preparations on the germination of seeds directly treated, (e) the effect of hormone preparations on the growth of perennial weeds, and (f) the effect of climate and soil on the herbicidal activity of hormone preparations. In trial (c), the germination of oat and barley seed deformed by 2,4-D and 4K-2M was considerably lower, and the seedling development poorer, than that of untreated seeds. The treatment of flax, mustard and poppy crops with up to 2 kg. per ha. of 2,4-D sodium salt appeared to have little effect on the germinating power of the seed, while similar treatments given to peas reduced germination of the seed and seedling vigour, compared with untreated seed. Applications of 1 kg. per ha. of Na 2,4-D and Na 4K-1M considerably reduced the germination of *Rumex crispus* seed, particularly in the case of the 2,4-D. With *Cirsium arvense*, similar treatments completely inhibited seed germination. In the case of *Centaurea cyanus*, these treatments both markedly inhibited seed germination. Applications of 1 kg. per ha. of Na 2,4-D reduced the seed germination of *Polygonum lapathifolium* from 74 to 18%. With *Chenopodium album*, 1 kg. per ha. of Na 4K-2M reduced seed germination from 82 to 66%. Treatment of *Taraxacum vulgare* at the pre-flowering and flowering stages with 2 kg. per ha. Na 2,4-D completely inhibited seed germination. In trial (d), a 0.025% solution of IPC completely inhibited the germination of barley seed and severely malformed *R. crispus* seedlings. The seed was soaked for 4 hr. in the solution. With *Sinapis arvensis* seed, soaking in 0.025 % IPC solution stimulated seedling growth, while 0.5 % solutions inhibited seedling development. 0.1 % Na 2,4-D solutions inhibited seed germination more in a number of species than did 4K-2M. In trial (e), the roots and stolons of *C. arvense*, *R. crispus*, *Taraxacum* sp., *Urtica dioeca*, *Sonchus arvensis*, *Polygonum amphibium* and *Agropyron repens* were sprayed with the equivalent of 2 kg. per ha. of Na 2,4-D and Na 4K-2M and 1 kg. per ha. of IPC and replaced in the soil. They were dug up 1 and 3 months after treatment. The 2,4-D had a greater herbicidal effect than the 4K-2M, except in the case of *P. amphibium*. IPC caused considerable injury to *R. crispus* within 3 months of treatment and also caused malformation in *A. repens* shoots and the death of almost all the stolons.—P.J.B.

1302 ORMROD, J. F. **To spray or not to spray. Some notes on selective weed control in cereals.** *Hereford. agric. J.* 1952, **12**, 229-37. [A.R.C. Unit Exptl Agron., Oxford]

This article discusses a few general aspects of the use of herbicides with special reference to weeds in cereal crops. It is of interest to farmers but does not give detailed information on the amount of herbicides to apply, volume rates, weeds controlled by particular herbicides or the stage of growth at which they are best sprayed.—K.L.

1303 ROBERTS, H. A. and WOODFORD, E. K. **DNBP for the control of weeds in peas.** *Agriculture, Lond.* 1951, **58**, 268-73. [Agric. Res. Coun. Exptl Agron. Unit., Oxford]

The results of trials at Oxford with the ammonium salt of DNBP for the control of annual weeds in pea crops are reviewed. In trials with applications of different amounts of DNBP applied in 100 gal. spray per ac., 1.5 to 2 lb. per ac. of DNBP resulted in 20 % higher yields of threshed peas than untreated controls, even though weed infestation was low. For applications of 2 lb. per ac. of DNBP, 4 in. was the minimum height of the peas at which spraying could safely be carried out, though under some conditions, peas were sprayed when at a height of 2 in. without injury. A table is given of the maximum height of a number of annual weed species at which effective control can be obtained by DNBP. Air temperatures exercise considerable effect on the herbicidal effects of DNBP ; at air temperatures of 60°F., or above, reductions in the rate of DNBP application are necessary to minimize crop damage, while applications made when air temperatures are below 55°F. are usually so ineffective as to be uneconomic. Varietal differences in reaction to DNBP have been established. Peas grown for picking green appear to be most susceptible to DNBP injury, canning and harvesting peas are intermediate in reaction, while field peas are least affected. In no case has any given variety tested proved so susceptible to DNBP damage that applications of 1 to 2 lb. per ac. have not been advisable.—P.J.B.

1304 HUNT, J. L. **Weed control in peas.** *Fmr & Stk-Breed.* 1952, **66**, 44-5.

Full details are given for the control of 16 important annual weeds in leguminous crops in Great Britain by spraying with DNBP.—C.L.S.

1305 ALTONA, R. E. **The use of hormone weed-killers in Africa—south of the Sahara.** *Rhod. agric. J.* 1951, **48**, 560-2, illus. [Afr. Explosives and Chem. Industry, Ltd., Johannesburg]

In the course of this brief, general account of selective herbicides, the author stresses the importance of their time of application when used on weeds in dicotyledonous field crops, such as linseed, flax, potatoes and groundnuts. In the case of potatoes and groundnuts, the best results (with least damage to the crops) are obtained by spraying before the crop seedlings appear above ground.—K.L.

1306 WHITE, D. G. **Agricultural uses for maleic hydrazide.** *Agric. Chem.* 1952, 40-3 and 111, bibl. 3. [Pennsylvania State Coll., State College]

A summary is given of work done over the past 2 years on the use of maleic hydrazide as a herbicide and a growth-inhibitor.—P.J.B.

1307 FARM CHEMICALS. **CMU.** *Fm Chem.* 1952, **115**, 12-13.

A note is given on CMU (3 - (p - chlorophenyl) - 1, 1-dimethylurea), a new herbicide developed for semi-permanent weed control. Tests so far show that CMU, applied at rates between 20 and 50 lb. per ac. of wettable powder, will give complete control of all vegetation on treated areas for up to 18 months. It also shows promise for pre-emergence weed control in cotton and maize, when applied at a rate of 1 to 5 lb. per ac.—P.J.B.

1308 WARREN, G. F. **New herbicides—and new uses for old ones.** *Agric. Inst. Rev.* 1951, **6**, 27-9. [Purdue Univ., Lafayette, Ind.]

A list is given of 18 recently-developed herbicides, with short notes on their characteristics and uses. A simple, rapid procedure for evaluating new herbicides is briefly described.—P.J.B.

1309 CURRIER, H. B. **Herbicidal properties of benzene and certain methyl derivatives.** *Hilgardia* 1951, **20**, 383-406, bibl. 45. [Agric. Expt Sta., Davis, Calif.]

The toxicity of vapours and sprays when applied to barley, tomato and carrot plants, increased in the order: benzene, toluene, xylene and trimethylbenzenes. The resistance of the plants to the treatments increased in the order: tomato, barley, carrots, the last being relatively resistant to all treatments. The mechanism of toxic action of the chemicals studied is discussed. It was concluded that the mechanism of acute toxicity of the substances lay in their solvent action on the lipid constituents of the outer plasma membranes of the plant cells. Possible reasons are suggested for the relative resistance of the Umbelliferae to hydrocarbons and oils.—P.J.B.

1310 CHABROLIN, C. Dix années de recherches et d'essais sur le désherbage sélectif des céréales. Position actuelle du problème. [**Ten years' research and trials on the use of selective herbicides in cereals. Present position of the problem.**] *C. R. Acad. Agric. Fr.* 1951, **37**, No. 5, 219-22.

A short exposition is given of certain rules which have been evolved for the use of either (a) the nitroalkyl-phenols or (b) the phytohormones in different classes of cereal cultures.—G.M.R.

1311 BLACKMAN, G. E. and others. **Herbicides and selective phytotoxicity.** *Ann. Rev. Plant Physiol.* 1951, **2**, 199-230, bibl. 330. [Univ. Oxford, England]

The various types of tests for assessing phytotoxicity of herbicides are outlined. It is pointed out that comparisons between compounds based on a single dose level may give misleading results since, for a large number of biological effects, the relationship between the effect and the varying dose is sigmoid. "Therefore, for accurate comparisons between compounds, varying amounts or concentrations must be employed, so that the level which brings about a given response can be determined and the relative toxicities expressed in terms of the equi-effective dose level." The importance of the pH of the aqueous solution and the nature of the non-aqueous solvents, is indicated. The chemical structure, chemical properties, toxicity and biological action of specific herbicides are discussed. They are the dinitro-alkyl-phenols, oils and hydrocarbons, plant growth regulators, isopropyl phenylcarbamate and other synthetic plant growth regulators.—D.B.

1312 ONTARIO Department of Agriculture. Extn Circ. No. 75B. **1951 guide to chemical weed control.** 1951, pp. 2.

Tabulated recommendations are given for selective weed control in field crops and also classifications of annual, biennial and perennial weeds in respect of their susceptibility to 2,4-D.—P.J.B.

CROP BOTANY

1313 SREENIVASAN, A. and WANDREKAR, S. D. **Excretion of vitamin C during germination of leguminous seeds.** *Proc. Indian Acad. Sci.* 1951, **34**, 267-71. [Dept Chem. Technol., Univ. Bombay]

Excretion of small, but definite and measurable, amounts of ascorbic acid takes place during the preliminary period of soaking prior to germination of leguminous seeds. There is no secretion of the vitamin into the surrounding medium during the subsequent, normal germination period.—From author's summary.

1314 HUNTER, J. R. and ERICKSON, A. E. **Relation of seed germination to soil moisture tension.** *Agron. J.* 1952, **44**, 107-9, bibl. 16. [Michigan Agric. Expt Sta., East Lansing]

Studies were made to determine the minimum moisture requirement for germination of segmented sugar-beet seed, maize, soyabean and rice seed in the following Michigan soils; Miami silt-loam, Brookston sandy clay-loam, Nappanee clay-loam, Clyde clay and Bono clay. Soil temperatures were maintained at approximately 25°C. For the seed to germinate, it was necessary for it to reach a specific moisture content, this was 30.5 % for maize, 26.5% for rice, 50.0 % for soyabeans and 31.0 % for the sugar-beet seed. The maximum soil-moisture tension permitting seed germination was 12.5 atmospheres for maize, 7.9 for rice, 6.6 for soyabeans and 3.5 atmospheres for sugar-beet. The minimum soil-moisture content permitting the germination of sugar-beet seed was between 4.41 and 5.45 % for the Miami soil, 8.84 and 9.47 % for the Nappanee soil, 10.2 and 12.0 % for the Brookston soil and between 16.8 and 17.7 % for the Clyde soil. Where the moisture tension was not too high to permit of the seed imbibing moisture, but was too high to permit of germination, the seed rapidly became subject to fungal invasion and injury, indicating the value of the fungicidal treatment of seed prior to sowing in dry conditions. Maize was able to germinate in soil considerably drier than that in which sugar-beet seed would germinate, while rice and soyabean seed were intermediate between maize and sugar-beet in this respect.—P.J.B.

1315 SMITH, F. G. and THRONEBERRY, G. O. **The tetrazolium test and seed viability.** *Proc. Ass. Off. Seed Anal. N. Amer. 1951.* 1951, pp. 105-9, bibl. 25. [Iowa State Coll., Ames]

A note is given on the physiological basis underlying the use of tetrazolium, indophenol and methylene blue for determining seed viability.—P.J.B.

1316 PAŠKOV, G. D. [**Concerning the morphological character of the coleorhiza in the Gramineae.**] [Russian] *Bot. Ž.* 1951, **36**, No. 6, 597-606, bibl. 14.

Results are reported of studies with different genera and species of the Gramineae including, among others, maize, rice, barley, oats, *Aegilops* spp., *Bromus sterilis* and *Briza spicata*. The view is advanced that the coleorhiza of grasses is metamorphosed main seminal (primary) root which, as a result of having lost its primary function, has also almost completely lost the characteristics of the structures of the root. In the majority of grasses, however, on germination, the coleorhiza exhibits some of the morphological and functional characteristics of the root and is generally considerably extended. It is usually covered with root hairs which are capable of living and functioning for some time; but that part of the coleorhiza which corresponds to the apex of the normally developed root never bears root hairs and its epidermal cells differ from epidermal cells of other regions of the coleorhiza. The embryonic root, hitherto known as the primary root, is, according to its origin, apparently a lateral root because it arises endogenously within the coleorhiza, which the author regards as the main embryonic root. As a result of the coleorhiza having lost its primary function as main root, the lateral embryonic root (incorrectly designated the main root) is initiated very early in grasses, at the time of the formation of the embryo itself. On germination, this lateral embryonic root assumes the function of a main root even in the first few days of the seedling's existence—R.P.J.

1317 FRANCK, J. **A critical survey of the physical background of photosynthesis.** *Ann. Rev. Plant Physiol.* 1951, **2**, 53-86, bibl. 71, illus. [Inst. Radiobiol. and Biophysics, Univ. Chicago, Illinois]

1318 GAFFRON, H. and FAGER, E. W. **The kinetics and chemistry of photosynthesis.** *Ann. Rev. Plant Physiol.* 1951, **2**, 87-114, illus. [Inst. Radiobiol. and Biophysics, Univ. Chicago, Illinois]

1319 TURNER, J. S. **Respiration. The Pasteur effect in plants.** *Ann. Rev. Plant Physiol.* 1951, **2**, 145-68, bibl. 2, illus. [Univ. Melbourne, Australia]

1320 STEINBACH, H. B. **Permeability.** *Ann. Rev. Plant Physiol.* 1951, **2**, 323-40, bibl. 121. [Dept Zool., Univ. Minnesota, Minneapolis]

1321 LEVITT, J. **Frost, drought, and heat resistance.** *Ann. Rev. Plant Physiol.* 1951, **2**, 245-68, bibl. 81. [Univ. Missouri, Columbia]

The review covers papers published from 1941 onwards. The main reason for dealing with all three kinds of resistance in one review is the large mass of evidence pointing to the fact that development of resistance to one factor usually involves an increase of resistance to one or both of the others. This relationship applies only when the term resistance is used in the sense of withstanding or tolerating the frost, drought and heat in the very tissues of the plant, but not in the sense of opposing these factors or preventing their penetration into the plant. The review is confined to the former of these two interpretations of resistance. The section on frost resistance includes work on measurement and control of resistance, rate of freezing and frost injury, metabolism at freezing temperatures and the factors associated with frost resistance. The distinction is made between drought resistance and desiccation resistance. They are defined and the methods of measuring each are briefly referred to. The connexion between drought resistance and various other properties of a plant, (boron content, osmotic pressure, bound water content, permeability) are mentioned. The theories of drought resistance of Schmidt and of Stocker are then discussed. The section on heat resistance includes measurement of heat resistance and its importance in nature, factors affecting heat resistance and the theory of heat resistance. Finally the relationship between frost, drought and heat resistance is reviewed.—D.B.

1322 OPPENHEIMER, H. R. **Summer drought and water balance of plants growing in the Near East.** *J. Ecol.* 1951, **39**, 356-62, bibl. 31. [Agric. Res. Sta., Rehovot, Israel]

This paper was read before the section of Experimental Botany at the 7th International Botanical Congress, Stockholm, July, 1950. Studies on the water relations of plants were initiated in Palestine more than 20 years ago. The type of vegetation under observation has included desert plants and field crops. The main results of the work are surveyed and discussed under the headings: the problem of drought resistance; the principal ways of balancing the water budget; plant transpiration in the Near East; and the effectiveness of equilibration of the water balance. [From *Herb. Abstr.*]—M.H.

1323 THOMAS, M. D. **Gas damage to plants.** *Ann. Rev. Plant Physiol.* 1951, **2**, 293-322, bibl. 103. [Amer. Smelting and Refining Co., Salt Lake City, Utah]

Gas damage to plants has been investigated for over 100 years but the subject has not been previously reviewed. The earlier studies were in Europe and, for the past 50 years, there has been great interest in the subject in the United States and Canada. The gases which are discussed in this review are sulphur dioxide, the fluorine compounds, other halogen gases and the hydrogen halides, nitrogen oxides and ammonia, mercury vapour, smog (the combination of smoke and fog that characterizes the Los Angeles area), and carbon and sulphur compounds.—D.B.

1324 WHITE, P. R. **Nutritional requirements of isolated plant tissues and organs.** *Ann. Rev Plant Physiol.* 1951, **2**, 231-44, bibl. 223. [Mount Desert Island Biol. Lab., Salisbury Cove, Maine]

1325 BLUME, J. M. **Radiation effect on plants grown in soil treated with fertilizer containing P_{32}.** *Soil Sci.* 1952, **73**, 299-303, bibl. 8. [U.S. Dept Agric.]

Pot experiments were carried out with barley and oats grown in soils that had received surface applications of KH_2PO_4 solution, at a rate of 50 lb. per ac. of P, containing different amounts of P_{32} ranging from nil to 12,500 microcuries per g. of P. From determinations of the effect of the different amounts of P_{32} applied, it was apparent that the variations in yield and P-content of the plants, though in isolated cases statistically significant, were so small as to be negligible from a practical standpoint. It is considered that cell injury to plants may occur to some extent following the use of radioactive isotopes and this possibility should be envisaged when designing experiments.—P.J.B.

1326 ODDIE, T. H. **Radioactive isotopes in agricultural research.** *J. Aust. Inst. agric. Sci.* 1952, **18**, 2-7, bibl. 82. [C.S.I.R.O., Chem. School, Univ. Melbourne]

This is a review, with over 80 bibliographical references to the use of isotopes in agricultural research and in allied fields of science. [From *Herb. Abstr.*]—K.L.

1327 APRISON, M. H. and BURRIS, R. H. **Time course of fixation of N_2 by excised soybean nodules.** *Science* 1952, **115**, 264, bibl. 2. [Agric. Coll., Wisconsin Univ., Madison]

A description is given of a method for determining the rate of fixation of N_2 by excised soyabean nodules, using N_2^{15} as a tracer.—P.J.B.

1328 THERON, J. J. **The influence of plants on the mineralization of nitrogen and the maintenance of organic matter in the soil.** *J. agric. Sci.* 1951, **41**, 289-96, bibl. 27. [Pretoria Univ.]

The influence of growing plants on nitrification in the soil was studied by means of small lysimeters of which 4 were planted to a perennial grass, *Hyparrhenia* spp., 4 to an annual millet crop and 4 were left fallow. Nitrification was entirely repressed under the grass from the second season after its establishment onwards, and did not take place even when the grass was dormant in winter. This was due to a direct influence of the living root, since, in the fallow soil, which was treated similarly, nitrification took place freely throughout the winter. Under the annual crop a repression of nitrification could be detected only towards maturity of the crop and the soil solution was completely depleted of nitrates at this period. Nitrification was resumed, however, immediately after the crop was ripe and had died off, and continued through the winter. During the period that nitrification was depressed replaceable ammonia made its appearance in the soil in more than normal quantities. This fact is held to indicate that the plant exerts its influence on the mineralization of nitrogen in the soil by paralyzing the autotrophic dehydrogenase system of the nitrifying organisms without interfering with the process of ammonification and not, as has been claimed, by excreting such quantities of carbonaceous matter that nitrates are re-assimilated by micro-organisms. By virtue of the constancy of the carbon/nitrogen ratio in soils this influence of plants on the mineralization has a very important bearing on the conservation of soil humus and consequently on any system of alternate husbandry. Some of its implications are discussed with particular reference to local fertilizer practice and field experience. [From *Herb. Abstr.*]—From author's summary.

1329 MICHAEL, C. and DOERING, H. Über die Möglichkeit einer Stickstoffernährung des Hafers durch Leguminosen im Mischanbau. [**The possibility of obtaining nitrogenous nutrition for oats by growing them in a mixture with legumes.**] *Z. PflErnähr. Düng.* 1951, **53**, No. 2, 143-6, bibl. 6. [Agrichem. Inst., Univ. Jena]

The results of pot trials of oats grown alone and with *Vicia* spp. are analysed. The advantage of growing a cereal/legume mixture is not so much in the direct supplying of the non-legume with nitrogen by the legume as in the improvement of the fodder by the addition of the legume, which is richer in protein, calcium and phosphoric acid than the cereal, and especially in the effect of the legume on the soil, the N content of which is increased and its bacterial life and fertility promoted. —G.M.R.

1330 SCHMALFUSS, K. Über die Wirkung der Phosphatdüngung auf die Bildung phosphathaltiger Verbindungen im Getreidekorn. [**The effect of phosphatic fertilizers upon the formation of phosphate-containing**

compounds in the cereal grain.] *Z. PflErnähr. Düng.* 1951, **53**, No. 2, 155-9, bibl. 3. [Univ. Halle]

Summer wheat was sown in earthenware pots receiving 0, 15, 30, and 60 kg. P_2O_5 per ha. Yield, especially grain yield and the proportion of grain in the total harvest, increased with increases in the doses of phosphate. Analysis of the grain showed that a regular reduction in the N content took place with increased doses of P. The total P content diminished from the 0 series to the 30 kg. series, but then increased again with the highest (60 kg.) dose. The changes taking place in the proportions of phosphatide, phytin, inorganic P_2O_5, and remainder (nuclein) in the dry matter are tabulated and discussed.—G.M.R.

1331 Otting, W. Borgehalt und Verteilung des Bors in verschiedenen Pflanzen. [**Boron content and distribution of boron in different plants.**] *Z. PflErnähr. Düng.* 1951, **55**, 235-47, bibl. 9, illus. [Max-Planck Inst. Medizin. Forsch., Heidelberg]

A wide variety of plants was investigated for boron content. They included maize, fodder-beet, sugar-beet, several members of the Solanaceae and red, green and brown algae. All plants examined contained boron, chiefly in the leaves and the sexual organs and little in the root and fruit. Because of the relatively high concentration of boron in the leaf, the relationship of boron with the chloroplast was studied (using leaves of fodder-beet). Boron was present in the chloroplast but only loosely bound to it. Seaweeds contained a particularly high concentration of boron. [From *Herb. Abstr.*]—D.B.

1332 Bertrand, G. Présence générale et rôle probable du sodium dans les plantes. [**General presence and probable role of sodium in plants.**] *C. R. Acad. Agric. Fr.* 1951, **37**, No. 7, 259-61, bibl. 8.

Studies of 450 plant spp. from various parts of Europe revealed the presence of sodium in all. It is suggested that there is probably an analogy between the part played by sodium in animals and in plants, and that in plants it may contribute to the maintenance of osmotic pressure in the cellular sap and to the turgescence of the tissues.—G.M.R.

1333 Wind, J. Sporenelementen in de landbouw. [**Trace elements in agriculture.**] *Maandbl. LandbVoorlDnst.* 1951, **8**, 223-33.

A review is given of the role of B, Cu, Zn, Mn, Mo, Fe, Co and I in plant and animal nutrition, with particular reference to deficiencies of these elements in different regions of the Netherlands. [From *Herb. Abstr.*]—P.J.B.

1334 New York, Chilean Nitrate Educational Bureau, Inc., N.Y. **Bibliography of the literature on the minor elements and their relation to plant and animal nutrition. Vol. 2.** 4th ed., pp. 152, New York, 1951, 29 × 23.

1335 Vlasjuk, P. A. and Klimovickaja, Z. M. [**The accumulation of chlorophyll in plants under the influence of different systems of manuring in grass-arable rotations.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **77**, No. 5, 909-12, bibl. 2.

The trials included the following variants: control, no basic fertilizers applied; mineral system with the application per ha. of 50 kg. N, 50 kg. P and 60 kg. K; organic system with the application per ha. of 20 tons dung; organic-mineral system with the application per ha. of 20 tons dung, 50 kg. N, 50 kg. P, and 60 kg. K; organic-mineral system with the application per ha. of 10 tons dung, 25 kg. N, 25 kg. P, and 30 kg. K. [The time of application of the manures is not stated.] The experimental plants were the perennial herbage plants clover, fescue and lucerne in mixture, winter and spring wheat, kok-sagyz and sugar-beet. The more productive organic-mineral system of manuring in grass-arable rotations conditioned an increase in the content of chlorophyll in the leaves of winter wheat, sugar-beet, perennial herbage plant mixtures and kok-sagyz. [The effect on spring wheat is not given]. A slightly increased content of dispersed forms of chlorophyll in the leaves of the plants corresponded with the higher yield of hay of the herbage plants, of grain of winter wheat, and of roots of sugar-beet and kok-sagyz. —R.P.J.

1336 Larsen, P. **Formation, occurrence and inactivation of growth substances.** *Ann. Rev. Plant Physiol.* 1951, **2**, 169-98, bibl. 190. [Univ. Chicago, Illinois]

The review is given under the following headings: forms of auxin and auxin precursors and methods for their extraction and determination; the chemical identity of naturally occurring growth substances; the formation of growth substances; the production and occurrence of growth substances during certain phases of development (examples include grass seedlings, potato tubers, buds, leaves and stems, roots and enlarging fruits); and the inactivation of growth substances. The review covers the period from 1947, and some older references are given to link up with more recent studies. —D.B.

1337 Love, A. **Taxonomical evaluation of polyploids.** *Caryologia* 1951, **3**, 263-84, bibl. 105. [Inst. Bot. Genet., Atvinnudeild Háskólans, Reykjavik, Iceland]

The taxonomic implications of differences in chromosome number in given species are reviewed. Only about 7 % of the total number of species of higher plants have been cytologically examined, and about 90 % of this 7 % are contained in floras of north-western Europe. Intraspecific polyploidy has been reported in less than 7 % of the species of northern Europe, more than 90 % of these polyplotypes having previously been described as separate species by classical taxonomists. The author expresses the view that the most suitable principle to be followed in classifying intraspecific polyploids is that formulated by Nannfeldt in 1938, namely: " where polyplotypes of a given species are morphologically distinct, they should be recognised as separate species, even when the morphologic differences are small." Some 30 species, including *Rumex acetosella* and *Polygonum aviculare*, are reviewed to illustrate the fact that most intraspecific polyplotypes have been described as separate species by classical taxonomists.—P.J.B.

1338 MEIDNER, H. **An instrument for measuring changes in leaf thickness.** *S. Afr. J. Sci.* 1952, **48**, 210-11.

An account is given of a gear-wheel-type instrument which has been used in the field for the continuous determination of changes in leaf thickness. —K.L.

1339 TISELIUS, A. **Some recent advances in chromatography.** *Endeavour* 1952, **11**, 5-16, bibl. 28, illus.

The theory underlying chromatographic analysis is explained and apparatus illustrated. Brief accounts are given of partition chromatography and ion exchange chromatography. [From *Herb. Abstr.*]—D.B.

MISCELLANEOUS

1340 GAMMON, E. T. **Atmospheric fumigation of various seeds with methyl bromide.** *Bull. Calif. Dept Agric* 1952, **41**, 27-30. [State Dept Agric., Sacramento, Calif.]

Data are given showing the germination of seed of a number of crops, including cotton, linseed and peas, with different moisture contents, exposed to 2 different methyl bromide gas treatments, namely: (a) 1 lb. methyl bromide per 1000 cu. ft. for 24 hr. at 78 to 92°F. and (b) 2 lb. methyl bromide per 1000 cu. ft. for 35-36 hr. at 78 to 92°F. In each case, different samples were stored at a RH of 70-100 and at a normal RH for 7 days before treatment. The germination of the cotton and linseed samples was not affected by any of the treatments used. Peas with 6.82 % moisture content were little affected by any treatment, but the germination of seed with 8.75 %, or more, moisture content was impaired following all treatments. It is concluded that treatment (a) above at temperatures up to 90°F. will not damage seed, provided its moisture content is low. Where germination is impaired by methyl bromide treatment, thorough aeration for 2 weeks after the treatment will, in most cases, restore germination percentages to normal.—P.J.B.

1341 HOGAN, T. W. **Aerial spraying of locusts. Campaign in North-Western Victoria [in 1950.]** *J. Dep. Agric. Vict.* 1952, **50**, 112-14, illus.

An area of valuable irrigated crops and pastures in Victoria was successfully freed of locusts (*Chortoicetes terminifera*) by aerial spraying with a 1.3 % gamma BHC solution in a mixture of diesel fuel oil and Sovacide, applied at a rate of 2 gal. per ac. The total cost of the operation was about 14s. per ac.—K.L.

1342 WINTERINGHAM, F. P. W. **Some aspects of insecticide biochemistry.** *Endeavour* 1952, **11**, 22-8, bibl. 22, illus.

This review is largely concerned with the contamination of food as a result of the residual effects of insecticides applied to growing crops and stored food products. Accounts are also given of the mechanism of insecticides within the insect and of the chemical relationships between different insecticides. [From *Herb. Abstr.*]—D.B.

1343 ALLEN, T. C. and CASIDA, J. E. **Criteria for evaluating insecticidal phytotoxicity—aerial regrowth.** *J. econ. Entomol.* 1951, **44**, 737-40, bibl. 12. [Wisconsin Univ., Madison]

Details are given of a standardized laboratory technique for evaluating the phytotoxicity of insecticides, based on the linear growth of bean-stem sections grown under standardized conditions in nutrient solutions. Experiments using this technique demonstrated the existence of an auxin-like activity by DDT and even greater growth-stimulating effects in the case of methoxychlor and BHC gamma isomer. A relationship between the auxin content of plant tissues and the physiological effect of DDT was demonstrated.—P.J.B.

1344 GUILLAUME, A. Nouveaux essais de traitements, antiparasitaires de cultures de crucifères à l'aide d'insecticides sélectifs ne détruisant pas les abeilles. [**New experiments in the treatment of Cruciferae with selective insecticides which do not destroy bees.**] *C. R. Acad. Agric. Fr.* 1951, **37**, No. 2, 114-16, bibl. 1.

Laboratory and field trials with mustard and colza cultures in 1949 and 1950, have demonstrated phenothiazine to be a selective insecticide toxic to *Meligethes* spp. but harmless to bees. Chlordane, on the other hand, was found to destroy both bees and pests, but trials of much smaller doses are to be undertaken.—G.M.R.

1345 CORNELL University Agricultural Experiment Station. Mem. 303. **Use of methyl bromide and other volatile chemicals for soil fumigation.** By *B. Lear.* 1951, pp. 48, bibl. 34. [Ithaca]

The results are given of exploratory trials with 40 different volatile chemicals for nematode control and the factors affecting the efficacy of ethylene dibromide mixture (Dowfume W-10), methyl bromide and D-D mixture.—P.J.B.

1346 HOLMES, E. **Insecticide-fungicide seed-dressings.** *Search* 1951, No. 2, 21-6. [Plant Protect., Ltd., Fernhurst]

A review is given of the use of organo-mercury seed dressings and BHC for wireworm control. Organo-mercury seed dressings which include gamma-BHC have been found to control all the usual seed-borne cereal diseases and have also given substantial protection against wireworm attack. Only where wireworm populations are in the region of 1 million, or more, per acre, will the BHC seed dressings not give adequate protection. The use of BHC in seed dressings is also far more economical than applying BHC broadcast, or through a combine drill. A number of overseas developments in the use of these seed treatments are noted.—P.J.B.

1347 MERTIN, J. V. **Plant quarantine survey in the Northern Territory.** *J. Aust. Inst. agric. Sci.* 1952, **18**, 27-32, bibl. 7.

In this survey of exotic plant diseases and pests which have entered the Northern Territory of Australia, it was found that there was no definite evidence for the presence of rice diseases, but *Pyralid* larvae were found infesting rice stems. Indian milkweed, *Calotropis procera*, which is becoming firmly established in the Upper Roper River Valley, was the most important weed found. Specimens of pink bollworm (*Pectinophora gossypiella*) and of minor cotton pests were found.—From author's summary.

1348 AMARAL, J. F., do. Principais doenças das plantas cultivadas no estado de São Paulo e seus respectivos tratamentos. [**The principal diseases of crops in the State of Sao Paulo (Brazil) and their respective treatments.**] *Biológico* 1951, **17**, 179-88.

The treatments are given for controlling the principal diseases of cotton, groundnut, rice, potato, cassava, maize, soyabean and wheat.—E.B.O.

1349 DYER, R. A. **Plant diseases** [**in S. Africa**]. *Fmg S. Afr.* 1952, **27**, No. 312, 179-80.

This is a review of recent work done in the Union of South Africa in the fields of mycology, virology and bacteriology. [From *Herb. Abstr.*]—K.L.

1350 LAUBSCHER, F. X. **Plant breeding for Southern Africa.** *Afr. reg. sci. Conf. Johannesburg, 17 to 18 October, 1949.* 1949, 2, 138-41. [Received 1952] [Coll. Agric., Potchefstroom]

A short review is given of the development of plant breeding in the Union of South Africa, stress being laid on the improvement of indigenous crops and the introduction of plants from analogous climates. [From *Herb. Abstr.*]—E.B.O.

1351 THOMPSON, H. R. **Factorial designs with small blocks.** *N. Z. J. Sci. Technol.* Sect. B. 1952. **33**, No. 5, 319-44, bibl. 5. [Dept Sci. Industr. Res., Auckland, N.Z.]

By a greater degree of confounding than usual in factorial experiments, designs with reduced block size have been obtained. Layouts and details of statistical analyses are presented for two- and three-factor designs, the number of plots per block in no case exceeding five. [From *Herb. Abstr.*]—Author's abstract.

1352 RICHARDSON, H. L. **A simple method for fertilizer tests.** *Internat. Rice Comm. News Letter* 1952, No. 1, pp. 2.

A simple method for fertilizer demonstration trials is described. Divide a uniform and representative field into 4 equal parts and on them apply at random the 4 combinations of 2 fertilizers at 2 levels. If the fertilizer effects are great one trial only will provide useful information. If the responses are small the results from a number of such trials on comparable soils may be combined in a randomized block design.—C.L.S.

1353 TEXAS Agricultural Experiment Station. Circ. 130. **Field crop statistics for Texas.** By *C. A. Bonnen* and *L. P. Gabbard.* 1951, pp. 57.

Statistical data are given of the acreage, yield and distribution of wheat, rice, rye, maize, grain sorghums, oats, barley, groundnuts and linseed in Texas, in most cases over the period 1880 to 1950. —P.J.B.

1354 BELGIAN CONGO, Institut National Étude Agronomique, Bur. Climat. Comm. No. 3. Chutes de pluie au Congo belge et au Ruanda-Urundi pendant la décade 1940-1949. [**Rainfall in the Belgian Congo and Ruanda-Urundi during the decade 1940-49.**] Pp. 248, 1951. [Bruxelles]

1355 LAUMONT, P. Ce qu'est le Service de l'Expérimentation Agricole en Algérie et le concours qu'il a apporté à l'amélioration de l'agriculture algérienne. [**The Algerian**

Service de l'Expêrimentation Agricole, what it is and the help it has given in improving Algerian agriculture.] Pp. 20, Oran; 1950. [Received 1952]

The Service de l'Expérimentation Agricole co-ordinates and supervises all important agricultural experimentation in Algeria. Its objects, functions and achievements are described. It includes, amongst other institutions, the Central Station at Maison-Carrée for seed testing and improving the principal crops; as well as regional experimental stations.—E.B.O.

1356 GRAUSTEIN, Jeannette, E. **Nuttall's travels into the old Northwest.** *Chron. Bot.* 1950/51. **14**, No. 1/2, pp. 611, illus., maps. [Dept Biol. Sci., Univ. Delaware]

The Lancashire-born Thomas Nuttall became an outstanding collector of North-American plants. Almost immediately after his arrival in North America he made the acquaintance of Benjamin Smith Barton of Philadelphia and was employed by him to undertake collecting expeditions. The present volume is the diary of the 1810 expedition to Detroit and on to Winnipeg. The diary records the weather experienced, observations of plants and animal life, matters of geological interest and notes on the life of the Indians with whom he came in contact. An appendix gives a list, with scientific and common names, of animals and plants observed by Nuttall. [From *Herb. Abstr.*]—D.B.

1357 GLOVER, J. and STOREY, H. H. **Research on semi-arid regions.** *Afr. reg. sci. Conf. Johannesburg,* 17 *to* 28 *October 1949.* 1949, **2**, 165-6. [Received 1952] [Agric. For. Res. Organ., E. Afr. High Comm., Nairobi, Kenya]

There is a need to extend agriculture in the semi-arid regions of Africa. It can only succeed if special methods and crop plants are used. It is suggested that an assessment of our present knowledge on these points and of the directions in which research should proceed is desirable. Lines of research indicated are studies by plant physiologists and soil physicists on water-soil-plant relationships and by plant-breeders on drought-resisting or -evading grain plants and grasses. Certain initial work bearing on both has been done by the East African Agriculture and Forestry Research Organisation and a programme on the former is being planned. Concurrently, technological research will be needed on new or existing dry-land experimental stations. [From *Herb. Abstr.*]—From authors' summary.

1358 MOROCCO. Direction de l'Agriculture, du Commerce et des Forêts. Les cahiers de la recherche agronomique. 3. [**Agronomic research papers. 3.**] Pp. 479, 1950. [Received 1952] [Serv. Rech. Agron. Expt Agric., Rabat]

[See Abs. Nos 1118 and 1119.]

1359 FARMING IN SOUTH AFRICA. **Agricultural education in South Africa.** *Fmg S. Afr.* 1952, **27**, No. 312, 219-23.

This article outlines the development of agricultural education provided by the five agricultural colleges: Stellenbosch-Elsenburg (Cape Province); Cedara, Natal; Potchefstroom, Transvaal; Grootfontein, Middleburg (C.P.), and Glen, Orange Free State. [From *Herb. Abstr.*]—K.L.

1360 CANADA. Ministry of Agriculture. **Directory of organization and activities of the Canada Department of Agriculture.** Pp. 53, 1952.

1361 BELGIUM. Ministry of Agriculture. Liste nominative du personnel du Ministère de l'Agriculture. [**Staff-list of the Ministry of Agriculture, Belgium.**] *Rev. Agric.* Suppl. Pp. 36, No. 4, April, 1952.

1362 UNITED NATIONS Educational, Scientific and Cultural Organization. **Scientific institutions and scientists in Latin America. Argentina. 3rd Vol.** Pp. 150, 1952. [In English, French and Spanish] [Montevideo]

1363 ROME, Food and Agriculture Organization of the United Nations. **Catalogue of publications 1945-1951, including available publications of the former International Institute of Agriculture 1910-1946.** Pp. 32, 1952.

1364 FRENCH EQUATORIAL AFRICA. Institut d'Études Centrafricaines. Mém. No. 4. Catalogue de la bibliothèque de l'I.E.C. (Matières, auteurs et périodiques). [**Catalogue of the library of the Institute of Central African Studies.** (**Subjects, authors and periodicals**).] By *Jeanine Lambert.* 1951, pp. 152. [Brazzaville]

There is a section on botany and one on climatology. [From *Herb. Abstr.*]—E.B.O.

1365 UNITED NATIONS Educational, Scientific and Cultural Organization. **Bibliography of scientific publications of South Asia (India, Burma, Ceylon). Nos. 3 and 4.** Pp. 84 and 86, Delhi; UNESCO Sci. Co-op. Office S. Asia, 1950.

1366 ENDEAVOUR. **The accessibility of knowledge. 2.** *Endeavour* 1952, **11**, 3-4.

The editorial of the above issue expounds the decimal classification for library cataloguing, a classification used " in thousands of libraries, information bureaux, professional institutions, research institutes, government offices, and manufacturing concerns." [From *Herb. Abstr.*]—D.B.

REVIEWS AND REPORTS

REVIEWS

1367 Hosier, A. J. and Hosier, F. H. **Hosier's farming system.** Pp. 244, illus., London; Crosby Lockwood, 1951, 22 × 14, 21s.

This is a fascinating story of a vigorous individualist who left farming for engineering in 1904 but returned to the land in 1910, with practically no capital, and through hard work, inventiveness and experience gained, steadily built up his farming business so that today Hosier owns over 11,000 acres, of which he actively farms 7000 acres. In the 1920's, A. J. Hosier introduced his open-air system of milk production and until the outbreak of war in 1939 there was a steady development of his method in southern England. Hosier's method, which was originally based on the availability of considerable supplies of relatively cheap feeding stuffs, involved the use of a portable milking-bail, of his invention, incorporating a releaser-type milking machine. Under this system cattle lived in the fields right through the year so that no permanent buildings were necessary for them. The chalk downs of the south of England with their free drainage were ideal for this outdoor method, and large areas of over-light downland were steadily improved by the consant treading of cattle receiving a considerable ration of concentrates. His system also had the merit of giving a high yield of milk per man-day.

His book tells the story of his work, step by step, and takes us from his early years to his development of dairying, his initiation of the outdoor bailing system, his numerous ingenious inventions, the development of alternate husbandry, and so on to poultry keeping, clean milk, early reclamation schemes, the war and post-war years, methods of cultivation, haymaking, harvesting and threshing, grain drying, farm staff and general organization.

During his advance from the small rented-farm at the beginning of the century to the 11,000 acres of today, Hosier has built up a vast store of experience and knowledge which he now places at the disposal of others. His work has been an inspiration to many farmers in the past and this outstanding book, written with his son Frank, will certainly inspire many more, and, possibly, even his critics.

The book is written in an easy, pleasing style and, unlike some books by highly-successful men, is extremely modest.—A. G. G. Hill.

1368 Turner, N. **Fertility farming.** Pp. 264, illus., London; Faber and Faber, Ltd., 1951, 23 × 15, 16s.

The author's farming methods are those advocated by Sir Albert Howard and his school [see also *Herb. Abstr.* 10 : 1888; 15 : 1673; 16 : 1369; and 18 : 282]. Comparisons are made of the costs entailed by fertility farming with those of so-called orthodox farming and details are supplied of the systems of management adopted on the author's farm in Somerset. Attention is drawn specially to the successes which have resulted from the discarding of all chemicals (whether used as artificial fertilizers or in the treatment of stock ailments) and substituting a complete reliance on the use of herbs to maintain soil fertility, to feed live-stock and in all prophylactic measures.—M. Hall.

1369 Davies, C. **Mechanized agriculture.** Pp. 122, bibl. 22, illus., London; Temple Press, Ltd., 1950, 19 × 13, 8s. 6d.

The book is one in the Technical Trends Series which is designed to produce up-to-date introductions to various subjects for the student, the busy technician and the scientist. The author's objective is to " present a broad picture of what constitutes mechanized farming; how machines have evolved; . . . . the present trends in mechanization and the economies governing them." These aspects are covered in 16 chapters in which there is information on: the agricultural engineering industry; the Machinery Division of the Ministry of Agriculture; the source of power; ploughs and cultivators; sowing and planting; the hay field; the mechanization involved in the production of beer and bread; potatoes and sugar; weed and pest control; ensilage and crop drying.—M. Hall.

1370 Griffith, M. and others **Reclaiming land for agriculture.** Pp. 119, illus., London; Crosby Lockwood, 1951, 22 × 14, 12s. 6d.

Each generation in its progressive efforts fails to attain its fullest development and leaves the more difficult tasks to those who follow. Science and practice are unfailing in their exertions to discover new methods of solving these difficult tasks and a discovery or device in one field of scientific endeavour may ultimately have a profound influence on future progress in quite another one. Thus, the invention of the internal combustion engine at the end of last century made possible the reclamation of land which previous generations could not bring under cultivation.

Sir George Stapledon in his introduction returns to the theme of the early pioneers of land reclamation in this country and stresses the need for a thorough preliminary examination of the profit worthiness of any large reclamation scheme in the light of a detailed survey. Large-scale reclamation schemes should form part of the national policy since enormous sums of money need to be invested in them. Sir George also stresses the profound importance of the ecological approach to the whole problem since that implies the realization of the importance of soil conservation and the future utilization of the land. Methods of farming should be designed to fit local conditions rather than made to conform with a general description such as 'marginal,' which, in Sir George's view "tends to stultify both thought and purposeful action."

Moses Griffith who writes on the reclamation of hill- and moor-land does so with authority since he was the Lands Director of the Cahn Hill Improvement Scheme, under Sir George Stapledon. He estimates that there are in Great Britain approximately 5 million acres of land capable of very substantial improvement and describes the varied natural vegetation of this land and the different methods of reclamation that should be adopted. A notable feature of the Cahn Hill Improvement Scheme was the successful pioneer work achieved in dealing with bracken-infested land and bog land. Pioneer cropping methods and particulars of the seeds mixtures used are very adequately dealt with. The need for scientific management and the adaptation of practical rotations are stressed. If criticism may be offered here it is to the brevity of Mr. Griffith's account of the utilization of the improved swards for the production of livestock and live-stock products. Again, the opinions expressed on the advantages of cross breeding sheep for the lower hill-slopes and marginal lands are apparently based on observational rather than on experimental evidence. One is inclined to suspect such observations unless they are related to the study of the climate of the environment and the system of husbandry practised.

J. F. H. Thomas in the section on Land Reclamation on the Chalk Uplands gives us a general description of these areas and a brief history of their utilization in the past. Much of this chalk upland is now derelict because of the lack of a policy for providing adequate water supplies for dairying, after economic circumstances had necessitated the abandonment of arable sheep-farming. He pays tribute to Hosier's pioneer work in introducing the open-air dairying system into these areas during the inter-war period.

Mr. Thomas describes the types of chalk upland that need reclamation and the methods to be adopted in each case, paying particular attention to the manurial requirements, cultivation and rotations. The capabilities of the land he has in mind are obviously much greater than these described by Mr. Griffith, consequently they call for a much bolder policy.

In the description of the Reclamation of the Fens and Silts, Mr. R. Line deals with land the value of which, after reclamation, is immeasurably higher than that described in the other sections of the book. He also deals with some of the special problems of reclaimed fenland, including its manurial requirements and the control of weeds. The book is well illustrated with excellent photographs depicting reclamation in progress and the fruitful results of various enterprises.

The provisions of the Hill Farming Act are set out in an Appendix, together with the proposed legislation for encouraging stock rearing in marginal and upland areas.

In the light of more recent developments it is perhaps a pity that the authors have not considered the place and the scope of the agricultural meteorologist and climatologist in schemes for agricultural expansion.

This book offers a wealth of information for the student and the advisory officer, and should serve as a detailed guide for the up-to-date farmer who proposes to undertake land reclamation.[From *Herb. Abstr.*]—R. Phillips.

1371 CHOUARD, P. Eléments de génétique et d'amélioration des plantes. Tome 1. Les mécanismes de l'hérédité élémentaire ou factorielle. [**Elements of genetics and the improvement of plants. Vol. 1. The mechanisms of elementary or factorial heredity.**] Pp. 114, illus., Paris; Centre de Document. Univ., 1951, 21×27, Fr. fr. 450.

1372 CRANE, M. B. and LAWRENCE, W. J. C. **The genetics of garden plants.** 4th ed., pp. 301, bibl. 446, illus., London; Macmillan and Co., 1952, 22× 16, 20s.

This is the 4th edition of an admirable work which gives an account of the main principles of genetics and cytology and explains how these principles can be applied by the plant breeder in his work of improving our plants. This new edition has been amended and revised in the light of recent research. The short account of heterosis formerly given in Chapter 6 has been enlarged and brought up-to-date and given a chapter of 10 pages to itself.

Although mainly concerned with horticultural plants, the book is also of considerable interest to breeders of field crops, for, apart from the main chapters on the genetics and cytology of diploid and polyploid plants, heterosis, variation, incompatibility, sterility, xenia, and the origin of new and improved forms, the book contains important sections on the potato and maize, amongst other crops. There are 69 illustrations, 44 tables, a glossary and a comprehensive bibliography. The book is well produced and is excellent value for 20s. For reviews of earlier editions, see *Horticultural Abstracts* 5:158 and 18:757.—A. G. G. Hill.

1373 CLIFTON, E. C. [Ed.] **Annual review of microbiology. Vol. 5.** Pp. ix + 379, Stanford, Calif.; Annual Reviews, Inc., 1951, 23 × 15, $6.00.

1374 Clapham, A. R. and others. **Flora of the British Isles.** Pp. 1591, bibl. 46, illus., Cambridge; University Press, 1952, 19 × 13, 50s.

The fact that it is now over 50 years since the appearance of an entirely new flora of these Islands gives the publication of this Flora of the British Isles a particular value and significance. The absence of a modern and easily-used flora for the identification of our wild plants, native and introduced, has been a very serious lack for many years past, during which time new knowledge about our plants has been steadily accumulating. The descriptions of plants given in this new flora have, with few exceptions, been drawn up afresh from living material or herbarium specimens, and the keys, whenever possible, make use of those characters which are as easy to observe in the field as in the herbarium. In addition to native plants, a very considerable number of introduced plants are described, either because they are now naturalized or else because they are of frequent occurrence.

In addition to the artificial key for the identification of families, each family is decribed fairly fully as regards its habit, vegetative structure and flowering details. Each genus is similarly described, while for each plant within the genus its description includes its English name, its present recognized scientific name and its former names, if any. This is followed by details of its flower structure, time of flowering, chromosome number where known, habitat and description. Additional information on time of flowering, pollination, fruiting, seed dispersal and germination is given in many cases—information which is of particular value to the agriculturist and plant breeder.

A study of the flora reveals a number of unfamiliar specific names, a necessary concession to the rule of priority in nomenclature, a rule that must some times lead to understandable resentment and even indignation on the part of some of us who learnt our botany when the century was still young.

Small initial letters have been adopted, very sensibly, for all specific epithets in the body of the book, but where these are commonly spelt with a capital this has been indicated.

No attempt has been made to describe all the numerous named varieties of British plants, but when plants which are morphologically similar have been shown to differ cytologically, or in geographical distribution or ecological preferences, the authors have recognized them as sub-species.

Botanists should be grateful for the simple classification adopted for the difficult genus *Brassica*, from which many species previously included in this genus have been excluded. Thus charlock, white mustard, hoary mustard and wall rocket, once included in the *Brassica*, have been transferred to other genera.

There are some 80 line-drawings to assist in making identifications, but the main illustrations will follow in a companion volume now in course of preparation.

The appendix contains: a bibliography of the principal works referred to in the text, a list of authors responsible for describing each family, a note on life forms, an 18-page glossary of plant terms and the index.

Great credit, and our thanks, are due to the authors of this admirable flora, produced as a matter of urgency in the remarkably short space of about 3 years. May their efforts stimulate botanists in other lands, particularly in the tropics, to compile similar modern floras based, not simply on descriptions of herbarium specimens, but also on the valuable additional information that is now available from ecologists, geneticists, cytologists and others, all of whom are interested parties.—A. G. G. Hill.

1375 Gilbert-Carter, H. **Glossary of the British flora.** Pp. 79, bibl. 18, Cambridge; University Press, 1950, 20 × 13, 8s 6d.

'This alphabetical glossary gives the meaning, pronunciation, and derivation of the generic, trivial, and varietal names of plants mentioned in current British Flora,, and in particular in the exhaustive new, *Flora of the British Isles*, published early in 1952. [See review above.]—A. G. G. Hill.

1376 Turrill, W. B. and Milne-Redhead, E. **Flora of tropical East Africa.** Pp. xii + 23, London; Crown Agents for the Colonies, 1952, 25 × 16, [price not shown].

The appearance of the first section of this long-awaited flora is largely the result of an enlightened recommendation made in 1947 by a panel of distinguished biologists, under the chairmanship of the late Sir Frank Stockdale, as the result of which extra staff were made available at the Royal Botanic Gardens, Kew, to expedite the preparation of a work on which botanists in East Africa, particularly P. J. Greenway of Amani, had been gallantly working, without sufficient facilities, for many years past. The publication of the complete flora will take some years since it is to be published in parts, family by family, as typescripts become ready for printing. The first family to be published in this way is the Ranunculaceae, pp. 1-23, which is dated 11 February, 1952. A key to the families and a general index are to be published on completion of the flora.

The publication of this flora will meet not only the special requirements of botanists and agriculturists, but will also provide valuable information for all those who are interested in the development of East Africa, a vast territory of over 680,000 square miles embracing Kenya, Tanganyika, Uganda and Zanzibar. [From *Herb. Abstr.*]—A. G. G. Hill.

1377 BONNER, J. and GALSTON, A. W. **Principles of plant physiology.** Pp. 499, San Francisco; W. H. Freeman & Co., 1952, 24 × 16, $5.50.

This is a clearly illustrated, elementary text-book for students of plant physiology and for those studying in the applied field of agriculture. The subject matter, which has a strong biochemical background, is in three sections: (1) nutrition, (2) metabolism and (3) growth and development. The first two follow the pattern usual for these aspects of physiology, the third treats of such subjects as the dynamics of growth, the auxin control of growth, the physiology of reproduction, dormancy and arrested development, the problem of differentiation and the plant and its environment. The authors have pruned the available material with the object of producing one central argument of basic principles of plant physiology. In the words of the authors " . . . detailed discussions of contradictory views have been avoided, as far as possible, in favour of synthesis of existing knowledge into a single working hypothesis." [From *Herb. Abstr.*]—D. Brown.

1378 CHOUARD, P. Dormances et inhibitions des graines et des bourgeons; préparation au forçage; thermopériodisme. [**Dormancy and inhibition in seeds and shoots; preparation for forcing; thermoperiodism.**] Pp. 157, bibl. 470, illus., Paris; Centre de Document. Univ., 1951, 21 × 27, Fr. fr. 600.

The review presents the underlying causes of the various aspects of dormancy exhibited in seed plants. The subject matter is treated fully under 6 heads: 1. Inhibition and dormancy in the seed. Two types of inhibition of germination are distinguished, one caused by a pause in the maturation process of the seed, the other accounted for by the structure and physical properties of the integument. Secondary dormancy, the relationship between dormancy and light, and longevity of seeds are discussed in this section. 2. Inhibition caused by correlations in growth between the shoot and its lateral buds. The seat of this type of inhibition is in the terminal bud, but a leaf can also exert an inhibitory influence on its axillary bud. Various theories have been advanced to explain these inhibitor influences of the terminal bud and of the leaf corresponding to its axillary bud but the matter is still an open question. 3. Dormancy of buds on branches of woody plants. Its causes and removal and its application to forcing are discussed. 4. Dormancy in rhizomes, tubers, bulbs and corms. The potato is taken as the example for the study of dormancy in tubers, and various flowering plants illustrate dormancy in rhizomes, corms and bulbs. 5. The daily rhythm of thermoperiodism. 6. Conclusion, the chemical processes of inhibition of growth are discussed. [From *Herb. Abstr.*]—D. Brown.

1379 CAMBRIDGE PEST CONTROL, LTD. **Pest control farmers' handbook.** 10th ed., pp. 104, illus., Cambridge; 1952, 21 × 14.

This handbook is intended to provide British farmers with up-to-date information on methods of crop protection. The rapid development of knowledge and the steady increase in results from field experiments in the past 2 years have made it possible to supplement considerably the information given in the 1950 edition. In the first chapters, the importance of pest control in agriculture as a national industry is explained and the routine of pest control in the broad framework of farming is described. This is followed by practical sections on the control of weeds, pests and diseases in the principal crops, among which are beans, sugar-beet, *Brassica* spp., cereals, linseed and potatoes. There are directories of insecticides, fungicides, weedkillers and spraying machinery.—E. Biasutti Owen.

1380 FREAR, D. E. H. **Pesticide Handbook, 1952.** Pp. 176. Pennsylvania; Coll. Sci. Publ.; 1952, 23 × 15, $.1.25.

The Pesticide Handbook, 1952, is the fourth expanded and revised edition of that first published in 1949, entitled "*Pest Control Materials*," under the auspices of the Maine and Pennsylvania Agricultural Experiment Stations and of the North-eastern Agricultural Experiment Stations. The publication of this handbook was first undertaken to provide summarized information on the very large number of different commercial insecticides and other materials which have appeared on the market in the USA and Canada of recent years. Though the title of this handbook would imply that it dealt with insecticides only, it contains extensive sections on herbicides, plant hormones, fungicides and seed treatment materials, fungicide-insecticide combinations, adjuvants, including wetting and spreading agents, etc., diluents, rodenticides, insecticidal equipment and wood preservatives. To this 1952 edition has been added new sections on animal repellents and on the properties, compatabilities and hazards of the common insecticide. The handbook is arranged in three sections; section I contains the names, in alphabetical order, of all the materials listed; section II lists all the materials according to their uses, such as fungicides, herbicides, etc., with a further breakdown on the basis of their active ingredients; section III lists all the manufacturers of the products in alphabetical order. Over 4400 different commercial products are listed. This handbook fulfils a very real need for concise, readily-available and up-to-date information on the multiplicity of different products on the market in the USA and Canada.—P. J. Boyle.

1381 COMMONWEALTH AGRICULTURAL BUREAUX. **Gazetteer of Agricultural and Forestry Research Stations in the British Commonwealth 1952.** Pp. 517, Farnham Royal; Commonw. Agric. Bur. 1952, 22 × 15, 30s.

This Gazetteer, published for the first time, represents an attempt to meet the expressed need for a publication which would supplement the information given in the *List of Research Workers in Agriculture and Forestry in the British Commonwealth*, also published by the C.A.B. It has been compiled from information supplied by Governments and contains particulars of over a thousand research stations, laboratories and experimental farms representing almost all branches of agriculture and forestry research in the British Commonwealth, with its wide variety of climates. The following layout is adopted: after describing certain organizations serving the Commonwealth countries as a whole, such as the C.A.B., the Commonwealth Economic Committee and the Bureau of Hygiene and Tropical Diseases, detailed information is given on the research stations in the following countries: United Kingdom, Canada, Commonwealth of Australia, New Zealand, Union of South Africa, Republc of India, Pakistan, Ceylon, Southern Rhodesia, British Colonial Territories (27), Anglo-Egyptian Sudan, and, although not part of the Commonwealth, the Republic of Ireland. In most cases the following information is given for each station: location, climate, altitude, soil, crops grown, research in progress and postal address. Certain Colonial Office research organizations and the Empire Cotton Growing Corporation are also briefly described.

There are alphabetical indexes of research stations and of subjects of research.

For those in search of information on agricultural research institutions in other countries, and their personnel, the following publications may prove useful:

1. Workers in subjects pertaining to agriculture in land-grant colleges and experiment stations. USDA Agriculture Handbook No. 3, April 1950.
2. Directory of organization and field activities of the Department of Agriculture: 1950. USDA Agriculture Handbook No. 12.
3. Directory of organization and activities of the Canada Department of Agriculture, 1952.
4. Scientific institutions and scientists in Latin-America. Argentina (3rd vol.). UNESCO, Montevideo, 1952.
5. Vade-mecum (des principales organisations internationales tenant compte spécialement de leurs rapports avec l'agriculture et des organisations agricoles internationales et institutions internationales apparentées a l'agriculture. Publ. by European Confederation of Agriculture (CEA), 1951.
6. Directory of international scientific organizations. UNESCO, Paris, 1950.
7. Indonesia. Organization for Scientific Research, Djakarta. Bull. No. 10. 2nd ed. Guide to scientists in Indonesia. 1951.
8. Liste Nominative du Personnel du Ministère de l'Agriculture [Belgium]. *Rev. Agric.* Supplement to No. 4, April, 1952. [From *Herb. Abstr.*]—A. G. G. Hill.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated by giving a reference to the abstract.

1382 **Great Britain.** Colonial Development Corporation. Annual report and statement of accounts for the year ended 31st December, 1951. London, 1952, pp. 73.

The general review which precedes the sections on administration, finance and accounts, states that at 31 December, 1951, there were 53 operational undertakings, an increase of 3 on 1950. Included in the 5 undertakings liquidated were the Gambia Poultry Farm and the Marudu Rice Farm. Brief progress reports are given on each project, 16 of which are classified as agricultural in function.—C.L.S.

1383 **Denmark.** Lolland-Falster Co-operative Agricultural Associations. Planteavlen paa Lolland-Falster, 1951. [Crop husbandry on Lolland-Falster, 1951.] Nykøbing, 1952, pp. 138.

INVESTIGATIONS REPORTED:

Abed Plant Breeding Station.

1. Oat varietal trials, 1949-50, pp. 8-11. In trials with 9 varieties on common field and marsh soils, Pajbjerg Rex A gave the highest grain yields, with 40.7 and 41.1 hkg. per ha., respectively. On low moorland soils, Abed Palu (206) gave the highest yields, with 41.4 hkg. per ha., followed by Svaløf's Steel A and Borris Opus II, with 39.5 and 39.3 hkg. per ha., respectively. On high moorland soils, Abed Palu (206) gave the highest yield of 6 varieties, with 36.1 hkg. per ha., followed by Pajbjerg Rex A and Borris Opus II, with 33.9 and 33.8 hkg per ha., respectively. On common field soils, Pajbjerg Rex A gave the highest straw yields, with 50.3 hkg. per ha. Brief notes are given of each variety tested and of trials with a number of new lines.

2. Barley varietal trials, pp. 11-14. Results are given of trials with 9 varieties at Abed, carried out as part of the official State varietal trials, together with the results of trials with 18 crosses and introduced varieties during 1950-51. Brief notes are given of the varieties included in the official State trials.

3. Manurial trials, pp. 19-29 and 45-67. Summarized results are given of trials in which a wide range of field crops was treated with different amounts of P, K, P + K, N, calcium nitrate and Chilean saltpetre, Ca, Mn, B and $FeSO_4$ and also very heavy applications of $FeSO_4$.

4. Varietal trials, pp. 30-6, and 67-83. Summarized results are given of trials with winter and spring wheat, barley, oats and sugar-beet varieties. Of 8 winter wheat varieties, Nord Desprez and Capelle Desprez gave the highest grain yields, with 45.1 and 43.1 hkg. per ha., respectively. Notes are given of each variety tested. Of 4 spring wheats tested, Pondus gave the highest yield, with 29.8 hkg. per ha., compared to 42.1 hkg. per ha., for Herta barley, used as a check. Of oat varieties, Pajbjerg Rex, Svaløfs Steel, Abed Minor, Abed Palu and Pajbjerg Regent gave average grain yields of 46.1, 45.1, 44.3, 43.6 and 43.0 hkg. per ha. In barley trials, the varieties Kron, Carlsberg, Drost and Herta gave average yields of 44.5, 44.3, 43.8 and 42.8 hgk. per ha. of grain, respectively. In sugar-beet trials, the varieties Klein Wanzleben N, Maribo N and Klein Wanzleben Poly (polyploid) gave average sugar yields of 74.2, 72.8 and 81.4 hkg. per ha., respectively.

5. Trials with different plant spacings for sugar-beet, pp. 36-8 and 83-9. Summarized trial results are given. The highest root and sugar yields were obtained from plants spaced 35 cm. apart in the row, in rows spaced between 47 and 55 cm. apart. Sugar yields for plants spaced 25, 30, 35 and 40 cm. in the row were 73, 74, 74.9 and 74.2 hkg. per ha. respectively.

6. Trials to determine the effect on sugar-beet of topping twice in the season, pp. 38 and 89-91. Sugar-beet was topped at the end of July and also immediately before lifting. Compared with untopped sugar-beet, mid-season topping lowered sugar and root yields by 38 and 35 %, while total top yields were increased by 50 %.

7. Studies on wild oats (*Avena fatua*) and their control, pp 109-30. An account is given of the campaign to clear wild oats from Lolland-Falster. Recommendations for control are given.—P.J.B.

1384 **Netherlands.** 15de NaCoBrouw Jaarboekje. [15th Yearbook of the National Committee for Malting Barley.] Rotterdam, 1951, pp. 99, English summary. pp. 5.

INVESTIGATIONS REPORTED :

1. The phosphate requirements of barley. By F. van der Paauw, pp. 40-6. See Abs. 1096.

2. Problems of the nitrogen uptake of barley. By J. G. Vermaat, pp. 54-64. A review is given of the results of previous work on the effect of NH_4 and NO_3 nitrogen on the N uptake and composition of barley, as influenced by soil pH, time of year, aeration of soil and the Mn, Cu, Mo, Cr and Ni status of the soil. NH_4 nitrogen appears to be less effectively utilized than NO_3 nitrogen. NO_3 nitrogen increased cation uptake, while NH_4 nitrogen stimulates P uptake and increases the protein content of barley. It is held that it is possible to obtain a barley of a desired composition by appropriate manurial treatment, but much work remains to be done on the subject.

3. Field trials with barley in 1950. By W. Wilten, pp. 65-74. Data are given of the yields of a number of barley varieties at different locations in the Netherlands.

4. Yield, varietal statistics and characteristics of barley varieties. By W. Wilten, pp. 75-85. In trials on a number of soil types, Balder gave mean yields 7 to 10% higher than Kenia on all soils except on sandy peat soils. In the western clay regions, Balder was outyielded only by a new German variety Heine 505. Herta MR II (mildew resistant) gave good results, particularly in the northern clay regions. In 1950, the total area under spring barley was 53,000 ha. of which Abed Kenia occupied 53 %, followed by Balder with 27 % (60 and 19 %, respectively, in 1949).—P.J.B.

1385 **Canada**. Report of the Minister of Agriculture for Canada for the year ended March 31, 1951. Ottawa, 1951, pp. 102.

INVESTIGATIONS REPORTED :

1. Disease-resistant wheat, pp. 20-1. Race 15B of wheat stem rust caused heavy rusting of durum and emmer wheats in Manitoba, while common wheats such as Redman and Thatcher escaped severe injury. An early build-up of inoculum is expected to cause more serious injury to common wheats in the future. Under conditions in western Canada, McMurachy wheat has shown resistance to race 15B rust and has been crossed to produce a number of rust-resistant common wheat varieties. The bacterial flora of Sevier wheat, consisting largely of *Bacillus subtilis*, which is antibiotic to *Helminthosporium sativum*, appeared to give this variety its resistance to this pathogen during the seedling stage. On removing the bacterial flora, Sevier became susceptible. Work is in progress to produce a better wheat variety than Rescue, with resistance to wheat stem-sawfly.

2. Oat varieties, p. 21. Race 7 of oat stem rust became widespread in 1950. Some recent derivatives of the oat variety Garry are resistant to *H. victoriae* and to all known races of oat stemrust.

3. Barley studies, pp. 21-2. Studies at Edmonton showed that loose smut of barley could be almost

eliminated from seed by soaking in a Spergon solution.

4. Potato studies, pp. 23-5. For late blight control, Bordeaux mixture has given the best results, compared with a number of other fungicides. For tuber rot control, copper fungicides gave the best results. High yields have been obtained from the use of sprays containing zinc. In field studies, setts dipped in $ZnSO_4$ solution produced more vigorous and higher yielding plants than untreated controls.

5. Effects of herbicidal oils on the physiology of plants, p. 32.—P.J.B.

1386 **Canada.** Manitoba Department of Agriculture. Annual Conference of Manitoba Agronomists. 1950. 1951, pp. 62.

The Cereal Committee report gives data of yields of common and durum wheat, barley, oat and flax from varietal trials at a number of locations and the percentages of the total acreages of these crops in Manitoba occupied by the major varieties from 1941 to 1950. A note is given on New Improved Redman and Lee wheat. Notes are given on the present status of wheat and oat stem rusts, leaf rust of wheat, crown rust of oats, flax rust and cereal smuts in Manitoba. In experiments to determine the effect of sowing cereal seed in soil of low moisture content (7 % moisture), the results indicated that standard germination tests give no indication of the germination percentage of seed sown in dry soil and that seed held in dry soil for 9 days may suffer badly from fungal invasion when germinated after watering. Seed treatment with organo-mercury fungicides is recommended for all seed likely to be sown in dry soil. Data are given of trials to determine the effect of ploughed-in crop residues with a wide CN ratio on the yield of wheat. The results showed that combined straw and stubble, also the roots and other residues of pure stands of grasses, when ploughed under significantly reduced the grain yield of wheat when taken as the first and second crop after ploughing under. Ploughed-in grass/legume residues did not depress subsequent grain yields. The effect of crop residues in decreasing grain yields was due to N deficiency caused by the wide CN ratio of the residues and could be offset by N applications at the time of grain sowing. In regional trials with potato varieties at 6 locations in 1950, Pontiac gave the highest yield of 10 varieties, with an average of 512 bu. per ac., followed by 337-M2 with 472 bu. and 594-M1 with 427 bu. per ac. 840-M1 gave an average yield of 383 bu. per ac., but was of outstanding quality, with a starch content of 16.22 % compared with 15.18 % for Pontiac. Of a number of new varieties under test, the American varieties Essex, Progress and Lasoda appear promising. Notes are given of weed-control trials in sugar-beet.—P.J.B.

1387 **Indiana,** Purdue University Agricultural Experiment Station. Progress of Agricultural Research in Indiana. 64th Annual Report for year ending June 30, 1951. Lafayette, 1951, pp. 147.

INVESTIGATIONS REPORTED:

1. New hybrid dent maize varieties. By S. R. Miles and J. E. Newman, p. 7. Notes are given of 4 hybrids, Ind. 803A, 686A, 680A and 501A, released to farmers in 1950.

2. Trials with small grains. By R. R. Mulvey and others, p. 9. A new spring oat variety, Mo.0-205, was released to southern Indiana in 1950.

3. Oat breeding. By R. M. Caldwell and others, pp. 10-11. Progress has been made in developing spring oat varieties resistant to Races 45 and 57 of crown rust, to replace Clinton and Benton. Two new winter oats, Clinton × Forkedeer and Clinton × Hairy Culbertson showed good winterhardiness for southern Indiana and stiffer straw than Forkedeer and Fulwin. It is hoped to combine resistance to crown rust Races 45 and 57 with these two varieties.

4. Electric traps for corn borer (*Pyrausta nubilalis*) control. By H. O. Deay, pp. 40-1. Notes are given on the development of electric traps using ultra-violet fluorescent lamps for corn borer control.—P.J.B.

1388 **Wisconsin** University Agricultural Experiment Station. Bull. 492. What's new in farm science. Pt II, 66th Annual Report for years ending June 30, 1950 and 1951. Madison, 1951, pp. 108.

INVESTIGATIONS REPORTED:

1. Redwood flax, pp. 52-3. Redwood is a new linseed variety to be released in 1952. It is a blue-flowered, brown-seeded variety, resistant to all rust races occurring in N. America. In Wisconsin, it has outyielded Redwing, Redson and Bison, even where no rust was present. It has very stiff straw and its seed has a high oil content.

2. Fungi and tuber formation in potatoes, pp. 60-1. Studies of potatoes, both healthy and diseased, indicated the presence of mycorrhiza in all cases. Where potatoes were grown in sterile vermiculite, in only 1 of 18 cases did tuber formation occur; in this one case mycorrhiza were found but in no other cases where tuber formation was absent, were mycorrhiza detected. It is thought possible that such mycorrhiza stimulate tuber formation.

3. Wireworm control, p. 61. Chlordane applied at a rate of 6 lb. per ac. to peat, or muck soils, effectively controlled wireworms and had a considerable residual effect.—P.J.B.

1389 **Puerto Rico.** Federal Experiment Station. Report of the Federal Experiment Station in Puerto Rico, 1951. Mayageuz, 1951, pp. 36.

INVESTIGATIONS REPORTED :

1. Kenaf (*Hibiscus cannabinus*) trial. By N. Almeyda, pp. 12-13. Highest seed yields were obtained from plants in 21 in. rows with 2 in. between plants. The optimum number of seeds per hole was 4 and the best sowing month for optimum seed yields was August.

2. Movement of 2,4-D in soil. By T. J. Muzik and others, p. 25. In both dry and saturated soil, the sodium and amine salts of 2,4-D, applied to the soil surface, did not move down below 1 in. from the surface following the application of 1 in. equivalent of rainfall. TCA moved downwards in the soil in direct proportion to the amount of "rainfall" applied.

3. Field testing of herbicides. By T. J. Muzik and others, pp. 25-6. In trials to control mixed weed stands, the action of TCA on grasses was much improved by the addition of 2,4-D and/or a contact killer. A combination of di-isopropyl dixanthogen and 2,4-D isopropyl ester, each applied at a rate of 2 lb. per ac. was particularly effective in controlling grass weeds.

4. Statistical evaluation of herbicides. By T. J. Muzik and others, p. 26. Notes are given on a technique for the rapid evaluation of herbicides under field conditions. For controlling Bermuda grass (*Cynodon dactylon*), a combination of TCA and di-isopropyl dixanthogen was more effective than TCA alone. Malojillo (*Panicum purpurascens*) was more sensitive to TCA than was Bermuda grass. Di-isopropyl dixanthogen in combination with 2,4-D as a pre-sowing and pre-emergence treatment was ineffective in increasing the activity of 2,4-D against grasses, but increased its effectiveness against broad-leaved weeds in some cases.

5. Nutgrass (*Cyperus rotundus*) control with methyl bromide.

6. Nutgrass physiology. By T. J. Muzik and H. J. Cruzado, p. 27. Notes are given on studies of the physiological basis of tuber sprouting.—P.J.B.

1390 **Jamaica** Department of Agriculture. Investigations 1949-50. Bull. No. 47. (N.S.) Kingston, 1951, pp. 127.

[See also *Fld Crop Abstr.* 4 : 1238.]

INVESTIGATIONS REPORTED :

1. Introductions and varietal trials of food crops, p. 39.
2. Maize varietal trials, p. 40. There were no significant differences in average yields of the strains JSY and MJ in 4 trials in different localities.
3. Spacing trials on swamp- and hill-rice, pp. 40-1.
4. Sorghum varietal trials, pp. 41-2.
5. Introduction and testing of fibre and oil-seed crops, pp. 42-8.
6. Groundnut varietal and fertilizer trials, pp. 45-8.
7. Soyabean and cowpea varietal trials, pp. 48-50.
8. Fertilizer and varietal trials on imported Irish potatoes in different localities, pp. 51-7.
9. Yam fertilizer trials, pp. 57-8. There was no significant response to any fertilizer considered by itself, but there was a significant interaction between N and K resulting in increased yields when these were applied together.
10. Cassava varietal trials, p. 58.—K.L.

1391 **South Australia.** Report of the Waite Agricultural Research Institute 1948-1949. Adelaide, 1951, pp. 68. [Received 1952]

In addition to the experiments reported in last year's Annual Report [see *Fld Crop Abstr.* 4 : 596] the following trials are in progress :

Investigations on the breeding of wheat varieties resistant to stem rust, p. 14.

Investigations on the genetics of resistance of wheat to various physiological races of *Tilletia caries* and *T. foetida*, p. 14.—K.L.

1392 **Queensland** Department of Agriculture and Stock. Annual Report for the year 1950-51. Brisbane, 1951, pp. 94.

In addition to the 1949-50 trials which have been continued [see *Fld Crop Abstr.* 4 : 595] the following investigations are reported :

1. Seed selection, green manuring and fertilizer trials with maize, p. 29.
2. Varietal, fertilizer, green-manuring and spacing trials with potatoes, pp. 30-1.
3. Varietal trials with sweet potatoes, p. 31.
4. Rate of seeding, time of seeding and varietal trials with rice. Under the season's conditions, the early-maturing varieties gave the best results, pp. 31-2.
5. Varietal and cultural trials with the fibre crops *Urena lobata*, *Hibiscus cannabinus*, *Corchorus capsularis* and *C. olitorius*, p. 32.—K.L.

1393 **New Zealand.** Department of Scientific and Industrial Research. 24th Annual Report. Wellington, 1951, pp. 80.

INVESTIGATIONS REPORTED :

1. Botany Division : work on the taxonomy of *Agropyron* is proceeding, p. 11.
2. The Crop Research Division has been formed from the amalgamation of the Agronomy Division and the wheat-breeding section of the Wheat Research Institute. This new Division is responsible for research on all field crops. Varietal trials on wheat, oats, barley, rye, potatoes, rape, flax, lupins and peas are reported, pp. 14-16.—M.H.

1394 **French West Africa.** Gouvernement Général. Inspection générale de l'agriculture. Rapport annuel 1950. [General inspection of agriculture. Annual report 1950.] Dakar, [n.d.], pp. 74, illus. [Received 1952]

An outline is given of the work conducted at the Centres de Recherches Agronomiques at Bambey and at Bingerville, at the Centre de Recherche Rizicoles and at other research centres in French West Africa. The measures adopted for controlling diseases and pests of crops (including locusts), and the general scheme for improving agriculture in these regions are briefly described. General information is given on groundnuts, cotton and rice in the various regions of cultivation, also on cassava, yam, cocoyam, sweet potatoes, millet (*Pennisetum* spp.), sorghum, fonio (*Digitaria* spp.) and maize.—E.B.O.

1395 **Southern Rhodesia.** Annual Report of the Director of Research and Specialist Services for the nine months ending Sept. 30, 1950. Salisbury, 1951, pp. 36.
[See Abs. 329.]

INVESTIGATIONS REPORTED :

1. Maize: varietal, time-of-sowing and manurial trials. Salisbury, p. 15.
2. Investigations on breeding high-yielding strains of hybrid maize adapted for the drier regions of the Colony. Matopos, p. 16.
3. Sunflower variety trials. Salisbury, p. 15.
4. Breeding trials on millets and sorghums. Matopos, p. 16. Investigations are in progress aimed at producing dwarf types of millets for combine harvesting and tall types for silage.
5. Experiments with vermiculite as a medium for germinating large seeds such as maize, pp. 33 and 36. The time taken for the germination and disease tests was considerably reduced and manipulation simplified when vermiculite was used. The general conclusion reached is that vermiculite can be used to great advantage in seed boxes and pots but that, in field work the disadvantages outweigh the advantages.—K.L.

1396 **Mauritius.** Annual Report of the Department of Agriculture, 1950. Port Louis, 1951, pp. 92. [Received 1952]

INVESTIGATIONS REPORTED :

1. Trials on interplanting sugar-cane with maize, groundnuts and dholl Kessari (*Lathyrus sativus*), p. 26.
2. Fertilizer trials on oats, linseed, sweet potatoes, groundnuts and rice, p. 26.
3. Potato variety trials, pp. 26 and 42. Though disease affected yields, the variety 134 outyielded Up-to-Date.
4. Trials on growing dholl Kessari after groundnut at Pamplemousses, p. 38. The local climate appeared too hot and dry for successful growth of Kessari.
5. Comparison of yields of early and late varieties of groundnut grown in spacings of 12 in. × 15 in. and 12 in. × 14 in. at Pamplemousses and Réduit, pp. 38-9.
6. Trials on the effect of slaked lime on groundnuts at Pamplemousses, p. 39. There was no response to slaked lime applied 5 weeks before sowing.
7. Comparison of yields of maize from soaked and unsoaked seed, p. 40. Seed was soaked for 12 hours at the rate of 50 cc. water per 100 g. of seed. The "soaked" plots outyielded the "unsoaked" plots, yields being 1157 kg. as compared with 1060 kg. per acre.
8. Fertilizer and spacing trials on manioc (*Manihot* sp.), p. 40.
9. Investigations on the yield of fresh fruit and dry seeds of okra (*Hibiscus esculentus*), p. 41.
10. Potato varietal trials at Pamplemousses, p. 41. The variety Malgache was more resistant to potato blight than Up-to-Date.
11. Trial with sweet potato (*Ipomoea batatas*) to compare tubers and vines as planting material, pp. 42-3.
12. Fertilizer and time of planting trials with yams (*Dioscorea*), pp. 43-4. Very early and very late planting result in lower yields than those obtained from the usual planting dates.
13. Control of insect pests of pigeon pea (*Cajanus indicus*) with 1, 2 and 4% DDT spray, pp. 78-9. Applications of 4 % DDT gave the best control.—K.L.

1397 **Mauritius.** Annual Report of the Department of Agriculture, 1949. Port Louis, 1951, pp. 78.

INVESTIGATIONS REPORTED :

1. Trials comparing the yields of introduced and local varieties of groundnuts, pp. 23-4.
2. Investigations on groundnuts interplanted with maize sown at spacings of 3 ft. × 3 ft., 4 ft. × 2 ft., and 4 ft. × 3 ft. grown after cassava, p. 24.
3. Trials comparing the yields of groundnuts sown at the rates of 2 seeds and 4 seeds per hole, p. 24. Yields were 717 kg. per ac. from the former and 827 kg. per ac. from the latter.
4. Planting-distance trials with maize and cassava (*Manihot* sp.) pp. 24-5.
5. Trials to compare the yields of sweet potatoes (*Ipomoea batatas*) grown from cuttings with those grown from tubers, p. 26. Yields from cuttings were 1250 kg. per ac. and from tubers 700 kg. per ac.
6. Varietal and time-of-planting trials with yams (*Dioscorea* sp.), pp. 26-7.
7. Experiments on the control of insect pests of pigeon pea (*Cajanus indicus*), pp. 64-5. A spray of 4 % DDT reduced insect attack.—K.L.

NEWS ITEMS AND NOTES

Great Britain

1398 APPLIED STATISTICS. This new scientific journal, a publication of the Royal Statistical Society, made its first appearance in March, 1952. *Applied Statistics* has been founded to meet the needs of all workers concerned with statistics—not of professional statisticians only but also of those innumerable workers in industry, commerce science, and other branches of daily work, who must handle and understand statistics as part of their tasks. Its aim is to present, simply and clearly, the statistical approach and its value, and to illustrate in original articles modern statistical methods in their everyday applications. The annual subscription to the journal, obtainable from Oliver and Boyd, Edinburgh, is 25s. [From *Herb. Abstr.*]—A.G.G.H.

1398 PLANT PATHOLOGY. We welcome the appearance of this new publication, a record of current work on plant diseases and pests, the first issue of which is dated March, 1952. This monthly journal, published for the Ministry of Agriculture and Fisheries by Her Majesty's Stationery Office, 'will contain original contributions: on plant diseases caused by fungi, bacteria, viruses and eelworms; on plant pests, including those of stored products; on damage by rodents and birds; and on nutritional and physiological disorders. It is intended primarily for the prompt publication of information on the incidence, distribution, recognition and control of plant diseases and pests in Britain. It will record survey work including estimates of crop losses, and contain much matter of topical interest on preliminary experiments and their provisional interpretations, on forecasts, and on precautionary measures.' [From *Herb. Abstr.*]—A.G.G.H.

1399 INDEX TO THESES ACCEPTED FOR HIGHER DEGREES IN THE UNIVERSITIES OF THE BRITISH ISLES. Every year much research work in the preparation of theses in the sciences and humanities is carried out in the Universities of the British Isles and the need has often been expressed for some means of making the nature of this research known to a wider public. Aslib hopes to satisfy this need by publishing the above index, compiled by P. D. Record.

The index, intended to be the first of an annual series, will list under broad subject headings those theses accepted at all Universities in the British Isles during the academic year 1950-51. It will include some 2100 entries, each containing the following details: author's name and initials; title of thesis and sufficient information to show the field covered where this is not clear from the title; name of University accepting the thesis; degree for which the thesis has been accepted. There will be author and subject indexes. The book will be printed by the Oxford University Press, and published by Aslib, 4 Palace Gate, London, W.8; price £1 1s. 0d to members of Aslib and £1 5s. 0d to non-members. [From *Herb. Abstr.*]—A.G.G.H.

1400 CROP SPRAYING COURSE. A course on weed control in farm crops by chemical spraying, arranged by the Institute of Corn and Agricultural Merchants, Ltd., was held at the Royal Agricultural College, Cirencester, from 7-12 July, 1952. Lectures and demonstrations were given on materials used for spraying and their effects, weed identification, the treatment of weeds on grassland, crop spraying and the handling of spray chemicals. *Agric. Mer.* 1952.—C.L.S.

1401 CHEMICAL DRYING OF GRAIN ON THE PLANT. A revolutionary method of reducing the moisture content of grain while it is still growing and just before harvest is being tried out in large-scale experiments. The process consists of the application of chemicals in dust or spray form to the growing crop and obviously can best be done by aircraft. Chemicals include chlorate mixtures and sodium cyanide in spray solution, and calcium cyanide as a dust. Their effect is to reduce the flow of moisture from the roots of grain to the heads, sometimes by as much as 2 % per day. In the USA, application of the chemicals a few days before normal harvesting has brought moisture contents down to as low as 8%. *Fmrs Wkly* 27 June, 1952.—C.L.S.

1402 COTTON PRODUCTION IN THE UK DEPENDENCIES IN 1950-51. The recently published 47th annual report of the British Cotton Growing Association reveals that production of cotton in the United Kingdom dependent territories in the season 1950-51 amounted to about 502,000 bales of 400 lb.—between 1 and 2 % of total world production—compared with about 483,000 bales in 1949-50. In addition, production in the Anglo-Egyptian Sudan reached the record of 526,000 bales, compared with 360,000 bales in 1949-50. The following table shows the production in the dependent territories in the last three years. The year given is the year in which the crop was harvested.

BALES OF 400 lb.

	1949	1950	1951
Uganda	391,000	340,000	346,500
Tanganyika	51,300	49,700	44,700
Kenya	9,800	8,000	13,800
Nyasaland	2,200	10,700	4,150
Nigeria	51,150	62,300	76,600
West Indies	6,700	5,600	6,100
Others	3,000	7,000	10,300
Total	515,160	483,300	502,150

Commonw. Survey May, 1952.—C.L.S.

1403 RICE PRODUCTION IN THE DEPENDENCIES. In an adjournment debate in the House of Commons on 10 April, 1952, the Minister of State for Colonial Affairs gave the following facts. Production of rice in the British dependencies is steadily increasing and has risen from 715,000 tons in 1937 to about 1 million tons in 1950, but is not increasing at the same rate as populations, or sufficiently to meet the needs of other importing territories. It is estimated that world supplies of rice are likely to fall short of demand by some 500,000 tons in 1952. But the degree of deficit is considerably higher than this in the British territories. Import requirements of the dependencies in South-East Asia are likely to be some 700,000 tons, while, in addition, Mauritius, Seychelles, and Aden have asked for some 61,900 tons. Government arrangements have been made whereby it is hoped that Siam will supply 300,000 tons, Burma some 19,500 tons and Indo-China about 50,000 tons. It is hoped that the balance of over 400,000 tons will come from ordinary private contracts, through further talks with Siam and Burma, and from the stepping-up of internal production. *Commonw. Survey* April, 1952.—C.L.S.

France

1404 RICE CONGRESS. The second congress organized by the Syndicate of French Rice Growers was held at Arles on 14/15 December, 1951. The various reports made were concerned with the present situation and the improvement of rice growing in southern France, mainly Camargue. Comparison was made with rice growing in Morocco. Among the rice varieties more widely grown in France are: Balilla, R. Bersani, Stirpe 136 and Maratelli, all from Italy. An experimental station for rice was founded at Merle in 1948. It is intended to produce locally all the seed rice required, 3000 tons of which were imported from Italy in 1951. *Terre maroc.* February, 1952.—E.B.O.

Germany

1405 A NEW CROP. Great claims have been made for a new hybrid plant, Topine, produced by Dr. Rühl of the Gesellschaft für Angewandte Chemie at Recklinghausen. It is said to be a cross between the Jerusalem artichoke (Topinambur), *Helianthus tuberosus*, and the sunflower, *Helianthus macrophyllus*. The new plant is claimed to be unexacting in its requirements and to give high yields of green tops and tubers. The green tops, which may grow to a height of 12-15 ft., are suitable for green or dry fodder and for ensilage. The tubers are suitable for human consumption or can be fed, chopped, to pigs or cattle; they are also suitable for making alcohol. In Germany the crop is planted in March and the green tops cut in the following autumn, the tubers being left in the ground over the winter and harvested in March, a year after planting.

Published results of scientific experiments substantiating the German claims made for this crop are awaited with interests. [*in litt.*]—A.G.G.H.

Italy

1406 COTTON IN THE COUNTRY OF ROME. Cotton, a long-standing crop in Sicily, is now being grown in the country of Rome. In Italy it is grown as a renovating crop in rotation with wheat. In Sicily, the varieties Acala and Stoneville are grown at present, but new varieties are being introduced. Of these, Locket 140, Delta Pine 15, Kirpan, Delta Pine Fox and Andalusia will also be tested around Rome. *G. Agric. Domen.* No. 16, April, 1952.—E.B.O.

1407 ISTITUTO DI TECNICA AGRARIA "N. STRAMPELLI" AT LONIGO, VICENZA. This Institute, which started to function in 1951, is intended to act as a link between agricultural research and practical farming. Its activities, carried out mostly in the Vicenza province, are directed mainly towards selecting and improving varieties of wheat, maize and sugar-beet. The official inauguration of the Institute took place on 2 June, 1952, on the occasion of the International Meeting of Mediterranean Cereal Cultivation. *Genet. agr.* November, 1951, and *G. Agric. Domen.* June, 1952.—E.B.O.

Algeria

1408 SEED LIST 1952. The Service de l'Expérimentation Agricole, Algeria, has issued a 32-page list of live-plant species and agricultural varieties present in its collections. The list contains many species and varieties of cereals and cotton, and varieties of groundnut, soyabean, flax, etc.—E.B.O.

1409 STATION CENTRALE D'ESSAIS DE SEMENCES ET D'AMÉLIORATION DES PLANTES DE GRANDE CULTURE AT MAISON-CARRÉE. The headquarters of this station have recently been moved to a new building surrounded by experimental fields covering 14 ha., two of which are irrigated. The programme of work is divided into 6 main sections, 4 of which are concerned respectively with improving: (a) winter cereals; (b) food crops such as legumes and potatoes; (c) summer cereals, forage crops and natural pastures; and (d) industrial crops, including cotton, oil crops and crops for producing sugar and alcohol, i.e., sorgho, sugar-beet, Jerusalem artichoke and sweet potato. A brief description of the organization of the Station, the investigations carried out in the various sections and the results obtained, particularly with regard to new crop varieties, is given in the September issue of *Elevage et Cultures* 1951.—E.B.O.

South Africa

1410 A NEW WHEAT VARIETY. The new wheat variety, Maluti, which is adapted to conditions in the eastern Orange Free State, was developed by the Potchefstroom Agricultural College by crossing Scheepers wheat with a wild variety, *Triticum timopheeve*, as well as with an imported type known as H44/24—a selection from the Hope variety. Maluti has strong straw which facilitates harvesting and is expected to have better baking quality, higher productive capacity and a heavier type of grain than the famous Scheepers wheat, while its slow growth will enable it to overcome the possibility of late frosts. *Fmr's Wkly, Bloemfontein* January, 1952.—K.L.

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